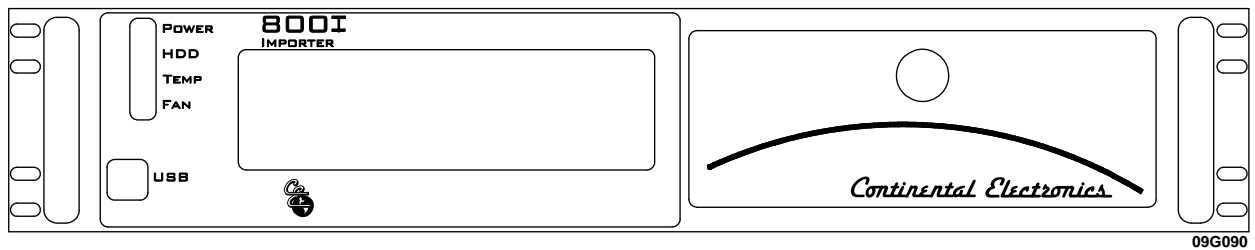


TECHNICAL MANUAL

OPERATION AND MAINTENANCE INSTRUCTIONS



TYPE 800I

HD IMPORTER

(P/N 200396-1 and 200396-2)

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PREFACE

This Operation and Maintenance manual gives the physical and functional description, installation, operation, theory of operation, maintenance, parts lists, and diagrams for the identified equipment. Operator and service personnel should become familiar with the manual contents before attempting to install, operate, or maintain the equipment. In addition to the Safety Summary which follows the Table of Contents, specific **WARNINGS**, **CAUTIONS** and **NOTES** are located throughout this manual where they apply. Continental Electronics (CE) manufactured this equipment to conform with current electrical, radiation, and safety codes of the United States to the extent that they apply. **It is the user's responsibility to comply with all local and national codes during installation and operation of the equipment.**

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SAFETY INFORMATION

I GENERAL

This safety summary is intended for trained and qualified personnel who are aware of the dangers inherent in handling potentially hazardous electrical circuits. It is not intended as a complete or authoritative medical treatment course, but should serve as a reminder of accepted emergency techniques. The equipment documentation must be reviewed for familiarization with safety markings and instructions before operation or maintenance activities are attempted. Know where and how to turn off main electrical power to the equipment. User personnel should have training in first aid and cardiopulmonary resuscitation (CPR) techniques. Emergency medical, fire, and ambulance telephone numbers should be posted in clear view adjacent to each telephone. Make a note if 911 service is available.

II ELECTRICAL SHOCK TREATMENT

In case of an electrical shock the **A-B-Cs** of basic life support treatment may be used while medical assistance is being summoned.

WARNING
HIGH VOLTAGE/RF HAZARD

WHEN A VICTIM IS IN CONTACT WITH HIGH VOLTAGE OR RF, ENSURE SOURCE POTENTIAL IS REMOVED AND CIRCUIT GROUNDED BEFORE ATTEMPTING ARTIFICIAL RESPIRATION. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY OR DEATH.

1. If the victim is not responsive follow the **A-B-Cs** of basic life support. Place victim face-up on a flat hard surface. Three critical areas (Airway, Breathing, and Circulation) need immediate attention:

WARNING
BITE HAZARD

USE CAUTION WHEN PLACING FINGERS IN VICTIM'S MOUTH, MUSCLE SPASMS CAN CAUSE THE MOUTH TO CLOSE WITH FORCE SUFFICIENT TO SEVER YOUR FINGERS. FAILURE TO COMPLY MAY RESULT IN LOSS OF FINGERS.

- a. **Airway** - If victim is unconscious, open airway by lifting up the neck while pushing back on the victim's forehead. Refer to Figure 1A. Clear mouth of obstructions and observe for breathing.

WARNING
RESCUER KEEP CALM

EXCESSIVELY DEEP AND RAPID BREATHING BY THE RESCUER MAY RESULT IN RESCUER BECOMING FAINT, TO TINGLE, AND EVEN LOSE CONSCIOUSNESS. BREATHING SHOULD BE NORMAL IN RATE WITH ONLY MODERATE INCREASE IN VOLUME. FAILURE TO COMPLY MAY RESULT IN RESCUE BEING PREMATURELY STOPPED DUE TO FATIGUE.

- b. **Breathing** - If victim is not breathing begin artificial breathing. Tilt head, pinch nostrils, make airtight seal with your mouth, and blow 4 quick full breaths into the victim's lungs. Refer to Figure 1B.
- c. **Circulation** - If victim does not have a pulse, see Figure 1C, begin artificial circulation. Depress sternum 1½ to 2 inches then release. Refer to Figures 1D and 1E. **WITH ONE** rescuer: Perform 30 compressions and 2 quick breaths at the rate of 100 per minute. **WITH TWO** rescuers: Same as one rescuer except switch between rescuers about every 5 cycles or 2 minutes.

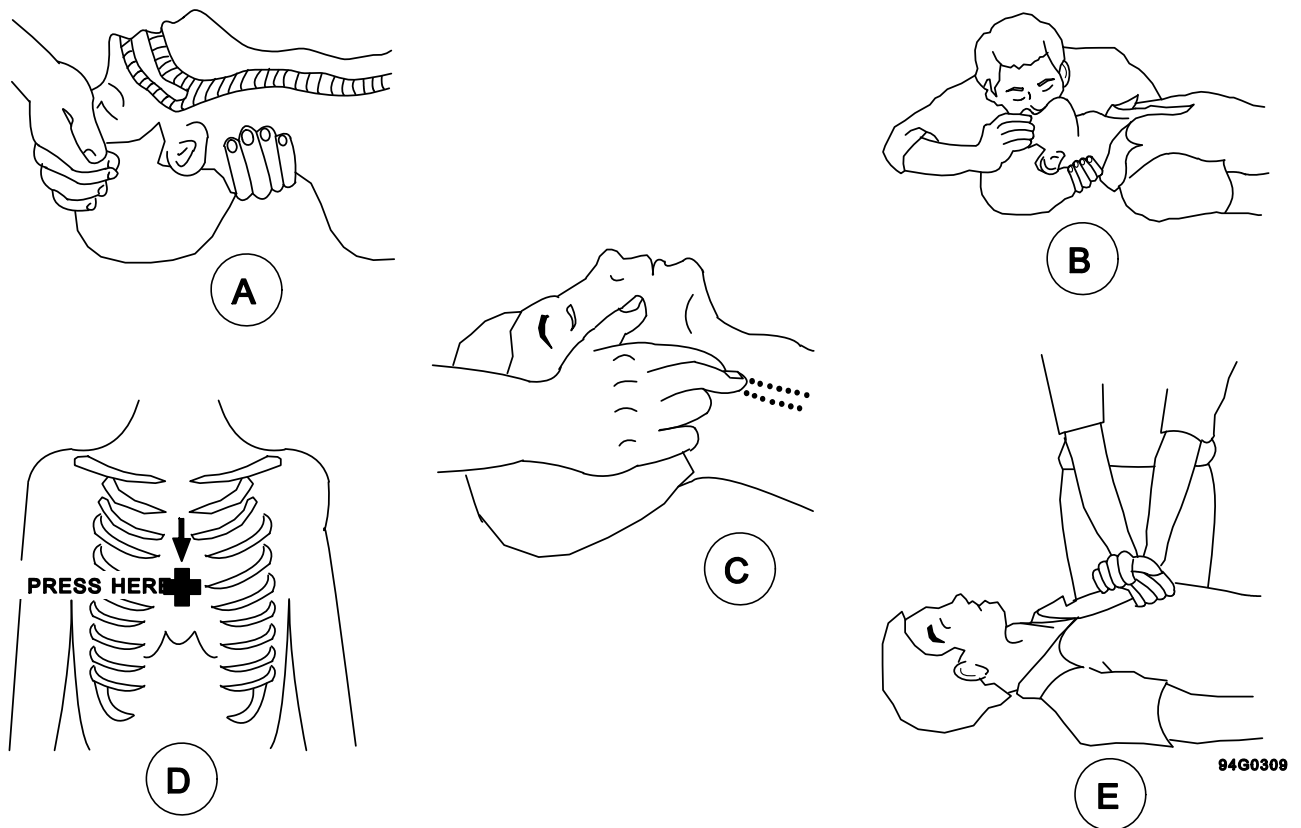


Figure 1. Artificial Breathing and Circulation.

2. If the victim is responsive treat for shock in the following way:
 - a. Keep victim warm.
 - b. Keep victim as quiet as possible.
 - c. Loosen victim's clothing.
 - d. Place victim in a reclining position if possible.
1. In case of extensive electrical burns and broken skin:
 - a. Cover area with clean sheet or cloth. (Cleanest available cloth article.)
 - b. Do Not break blisters, remove tissue, remove adhered particles of clothing, or apply any salve or ointment.
 - c. Treat victim for shock as follows: Keep victim warm, quiet, reclined, and loosen clothing.
 - d. Arrange transportation to a hospital as quickly as possible.
 - e. If arms or legs are affected keep them elevated.

III FIRST-AID

Users of this equipment are urged to become familiar with first-aid theory and practices. The following information is intended for reference only. It is important that all personnel using this equipment be prepared to give adequate Emergency First-Aid to fellow users.

III FIRST-AID - Continued

NOTE

If medical help will not be available within an hour and the victim is conscious and not vomiting, give him a weak solution of salt and soda: 1 level teaspoon of salt and 1/2 level teaspoon of baking soda to each quart of water (neither hot nor cold). Allow victim to sip slowly about 4 ounces (a half glass) over a period of 15 minutes. Discontinue fluid if vomiting occurs. (Do Not give alcohol.)

2. In case of less severe electrical burns (1st. or 2nd. degree) with no broken skin:
 - a. Apply cool (not ice cold) compresses using the cleanest available cloth article.
 - b. Do Not break blisters, remove tissue, remove adhered particles of clothing, or apply any salve or ointment.
 - c. Apply clean dry dressing if necessary.
 - d. Treat victim for shock as follows: Keep victim warm, quiet, reclined, and loosen clothing.
 - e. Arrange transportation to a hospital as quickly as possible.
 - f. If arms or legs are affected keep them elevated.

IV SAFETY SYMBOLS

Safety symbols shown below are typical of those used in the operation and maintenance manual:

WARNING

The **WARNING** sign as shown above, denotes a personal hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, may result in personal injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.

CAUTION

The **CAUTION** sign as shown above, denotes an equipment hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, may result in damage to or destruction of part or all of the equipment. Do not proceed beyond a **CAUTION** sign until the indicated conditions are fully understood and met.

V SAFETY PRECAUTIONS

Follow the safety precautions listed below in addition to any site safety precautions when servicing this equipment. Failure to observe these safety precautions may result in serious injury or death.

WARNING

DEATH OR SERIOUS INJURY MAY RESULT IF PERSONNEL FAIL TO OBSERVE THE FOLLOWING SAFETY PRECAUTIONS.

1. Never work on electronic equipment unless there is another person present who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the engineer or technician is aided by operators, he must warn them about dangerous areas.
2. Do not contact high voltage or current connections when power is applied to this equipment.
3. Whenever the nature of the procedure permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.
4. Make sure that all rings, watches, necklaces, metallic ear-rings, and other similar items are removed before working with this equipment.

V SAFETY PRECAUTIONS - Continued

5. Whenever possible, the power supply to the equipment must be turned-off and tagged or locked before beginning work on the equipment.
6. Extremely high current, low voltage, dc is used in portions of the equipment. Do not be misled by the low voltage rating (5 to 30 V dc) of the current sources. Severe injury to personnel and damage to the equipment can occur if the voltage sources are shorted (directly connected) to ground or ground returns by tools or test equipment.

- b. Ensure that radiation restrictions for nearby equipment or other high power rf radiation sources are observed before performing maintenance on this equipment.
- c. Prior to and during operation and maintenance, observe all radiation restrictions in effect at the site.
- d. If personnel are suspected or known to have been exposed to rf radiation in excess of rf radiation protection guidelines, consult medical personnel immediately.

VI VOLTAGE, CURRENT, and LIGHTNING HAZARDS

The voltage, current, and lightning hazards listed in 1 through 3 below exist for the equipment. For hazards associated with vendor equipment, refer to appropriate manuals furnished with the item.

1. The dc voltage hazards consist of potentials of 5 V dc to 250 V dc between power supply lines within the equipment.
2. High voltage, high current, 50/60 Hz ac power is supplied to the equipment.
3. Antenna systems acting as an attracting device present a lightning hazard to personnel performing maintenance on the equipment. No maintenance should be performed on the unit when thunderstorms are imminent or in progress, while the antenna is connected.

VII RF RADIATION HAZARDS

The rf radiation hazards listed in 1 and 2 below exist for the equipment. For hazards associated with vendor equipment, refer to appropriate manuals furnished with the item.

1. RF radiation from the equipment could present a potential hazard to personnel wearing cardiac pacemakers.
2. The following rf radiation hazard precautions shall be observed when operating or performing maintenance on the equipment:
 - a. Proper precautions shall be taken to protect cardiac pacemaker users.

VIII TOXIC MATERIAL/ENVIRONMENTAL HAZARDS

The hazards listed in 1 and 2 below may exist when performing maintenance of the equipment. For hazards associated with vendor equipment, refer to appropriate manuals furnished with the item.

1. Toxic or flammable solvents and corrosive chemicals used in cleaning operations may involve the use of caustic or acid solutions, skin irritants, and organic solvents that are flammable and/or toxic. The following precautions, as a minimum, must be observed by personnel using such materials.
 - a. Work only in well ventilated areas.
 - b. Wear organic vapor respirators when using organic solvents or corrosive chemicals.
 - c. Wear chemical safety goggles, gloves and aprons when using corrosive chemicals.
 - d. Do not use flammable chemicals near or inside the equipment while power is applied to the system.
 - e. Maintain a fully stocked first aid cabinet nearby for emergency treatment of scalds, burns, etc.
 - f. Flush away coolant or cleaning solvent contamination from any part of the body.
2. Benzene, Carbon Tetrachloride, Freon, and Trichloroethane based Solvents should only be used in well ventilated areas. The fumes are toxic and may be hazardous to your health or can cause death by suffocation.

IX MAJOR EMPLACEMENT AND MAINTENANCE HAZARDS

The precautions given in 1 and 2 below must be observed to prevent injury or death to personnel:

1. Installation and assembly hazards associated with the equipment are as follows:
 - a. After performing maintenance ensure the doors and covers are installed prior to attempting to return the equipment to service.
 - b. On all electrolytic capacitors, make sure terminal polarity markings [positive (+) and negative (-)] are observed when connecting capacitors to \pm dc buses.
2. While performing maintenance on the equipment, observe the following precautions:
 - a. Maintenance of equipment shall not be performed when thunderstorms and lightning are imminent or in progress.
 - b. When performing maintenance on the equipment make sure all ac power to the unit is removed.

X STATIC SENSITIVE DEVICES

There are some circuits throughout the equipment using metal-oxide-semiconductor (MOS) and complementary MOS (CMOS) integrated circuits. This requires stringent attention to handling techniques due to the sensitivity to static electricity. The following paragraphs outline the procedures to use when handling MOS or CMOS devices.

1. Electrostatic discharge hazards in MOS/CMOS devices are prevalent. Such damage can be produced by Electrostatic Discharge (ESD) due to improper handling or installation. All MOS/CMOS devices are susceptible to damage by the discharge of electrostatic energy between any two pins. This sensitivity to static charge is due to the fact that gate input capacitance (5 picofarads typical) in parallel with an extremely high input resistance (10^{12} ohms typical) lends itself to a high input impedance and hence readily builds up the electrostatic charges.

2. Electrostatic handling of MOS devices is of prime importance. Static electricity is always present in any work environment. It is generated when ever two different materials are rubbed together. A person walking across the floor can generate a charge of thousands of volts. A person working at a bench, sliding around on a stool, or rubbing his arms on the work bench can develop a high static potential. For preventing damage to devices due to ESD, use the following precautions:
 - a. Table tops or work areas should be covered with grounded conductive tops. Test areas should have conductive floor mats.
 - b. Tools and test equipment used in protected work areas shall be properly grounded. Ensure that soldering-iron tips are grounded. If plastic handled tools must be used, they shall be treated with a topical antistat.
 - c. Devices, or circuit cards with devices, should not be inserted into or removed from circuits with the power on because transient voltages may cause permanent damage.
 - d. Use a conductive wrist strap when removing a circuit card containing MOS/CMOS devices from a card cage or when removing a device from a circuit card.
 - e. The devices are to be stored or transported in static shielding bags, anti-static rails, or conductive foam.
3. ESD grounding is critical to safe handling of ESD sensitive devices. Earth ground rods for ESD protection shall be solid copper or copper jacketed steel and shall be driven six to eight feet into the earth beyond the work area floor slab with approximately six inches exposed for making connection. Dry soil conditions may require a copper sulfate drip. Electrical grounds shall be isolated from static grounds.

Water pipes offer convenient grounds; however, they may not be connected to earth ground. These techniques are for minimizing the difference of potential between separate grounds, and not for reducing the ohmic resistance to earth.

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SECTION 1 – GENERAL INFORMATION

1-1. INTRODUCTION

This Technical Manual contains instructions for installation, operation and maintenance of Continental Electronics Type 800I HD Importer. The Technical Manual is divided into the following sections:

- Section 1 - General Description
- Section 2 - Installation Instructions
- Section 3 - Operating Instructions
- Section 4 - Theory of Operation
- Section 5 - Maintenance Instructions
- Section 6 - Parts List
- Section 7 - Diagrams
- Section 8 - Supplemental Data

A table of contents is provided at the front for the manual, indicating the page number for the start of each topic. The following paragraphs describe the contents of each section of the transmitter Operation and Maintenance Manual.

1-1.1 Section 1 - General Information.

This section contains a physical and functional description of the Exporter and its major subassemblies. Also included in Section 1 is a List of Equipment Supplied (Table 1-1), List of Optional Recommended Equipment (Table 1-2), and List of Characteristics (Table 1-3).

1-1.2 Section 2 - Installation Instructions.

This section contains instructions to be followed while unpacking, staging and installing the Exporter, interface with the input/output connections of the Exporter, optional configurations and initial adjustments where required.

Existing wiring lists are included at the end of Section 2 for site level wiring. Also included are steps necessary to prepare the Exporter for initial turn-on.

1-1.3 Section 3 - Operating Instructions.

This section contains a description of controls and indicators, turn-on procedure, operating procedure, shutdown procedure, and emergency shutdown procedure.

1-1.4 Section 4 - Theory of Operation.

This section includes general functional theory and detailed theory of operation for the Exciter and its subassemblies.

1-1.5 Section 5 - Maintenance Instructions.

This section includes preventive and corrective maintenance procedures for the Exporter along with instructions for troubleshooting, and remove and replace procedures. Alignment and performance checks are included as appropriate.

1-1.6 Section 6 - Parts Lists.

This section includes electrical parts lists for the assemblies as shown in Table 6-1 and the Assembly Diagrams as shown in Table 6-2.

1-1.7 Section 7 - Diagrams.

This section includes schematic as listed in Tables 7-1 and 7-2.

1-1.8 Section 8 - Supplemental Data.

This section includes vendor data sheets and manuals as identified in Table 8-1.

1-2. PHYSICAL DESCRIPTION

The Importer is a standard 19-inch rack mounted assembly, requiring 2RU (3½-inch) panel space. Refer to Figure 1-1 for a view of the Importer. For complete technical specifications refer to Table 1-2. A list of all major subassemblies, in reference designator order, is provided in Table 1-1.

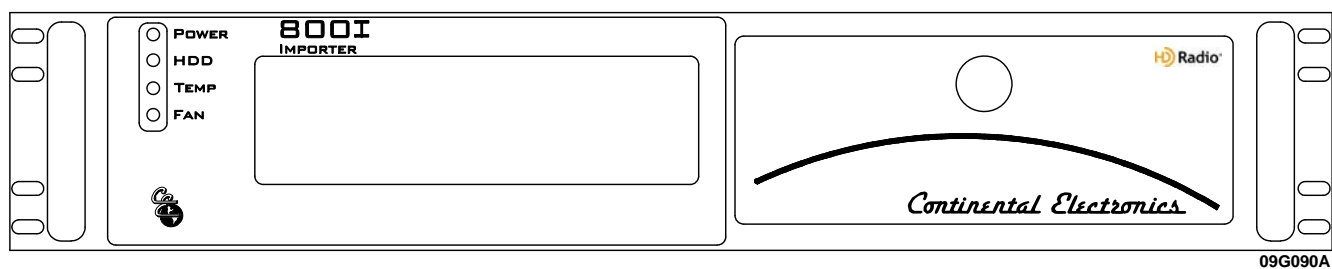


Figure 1-1. Type 800I HD Importer.

Table 1-1. List of Major Equipment Supplied.

Ref. Des.	Description	Part No.
–	HD Importer, 800I	200396-1 200396-2
A1	Digital Computer	109-0695-310
A2 (-1 only)	CCA, PCI Audio (Orban Optimod-PC 1101)	270-3359-020
A2 (-2 only)	CCA, PCI Audio (ASI 5111)	270-3359-040
A3 (-2 only)	CCA, GPS Clock Distribution	202223-1

1-3. FUNCTIONAL DESCRIPTION

The Importer adds supplemental audio/data, advanced applications services (AAS), and program-associated data (PAD) to the primary HD programming service. In addition, the Importer manages content and delivery from other service providers and supports iTunes Tagging. The Importer interfaces directly to the Continental 800E^{XP} Exporter.

A functional description is provided for the assemblies shown in Table 1-1, List of Major Equipment Supplied. For a list of acronyms and abbreviations refer to Table 1-3. Refer to Figures 1-2 and 1-3 during the functional description. The functional relationship of each of these units is shown in Figure 1-2, a simplified block diagram of the Importer.

1-3.1 Digital Computer, A1.

The Digital Computer controls and monitors overall Importer operation. The CPU multiplexes all of the service provider data, multicast audio and data streams, and outputs it through one of the rear panel LAN ports.

The computer is a rack mounted PC and uses the Microsoft Windows XP Pro operating system. Access to the user interface is with mouse, keyboard and monitor connectors on the back panel (or through another PC connected over the LAN).

The Importer also includes a DVD-RW drive, PCI Audio CCA, GPS Clock Distribution CCA (-2 version only) and a PCI Express slot for expansion. The Importer application software is supplied by Ibiquity.

1-3.2 PCI Audio CCA, A2.

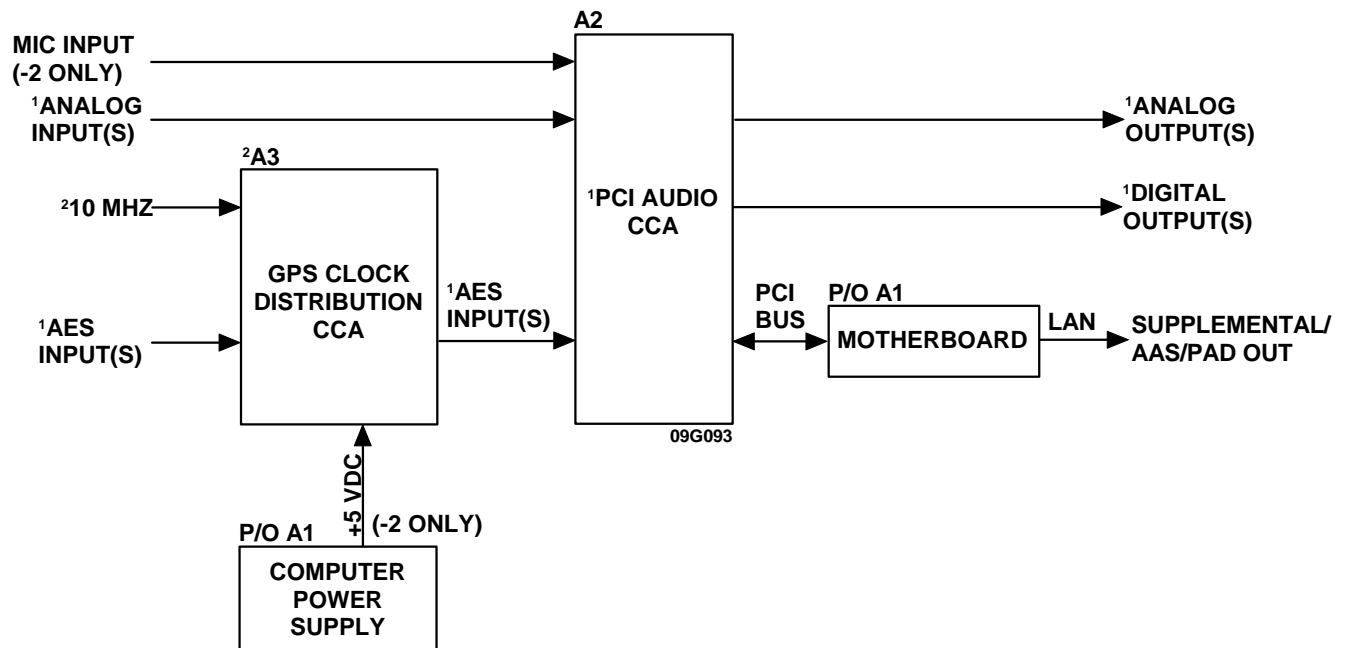
The -1 version uses an Orban 1101 audio card. The -2 version uses an ASI 5111 audio card. The audio card provides a variety of analog and digital inputs/outputs and other features depending on which card is used. The audio card mixes all analog, digital and Wave inputs, and routes the multiplexed stream to the motherboard for output to the LAN.

1-3.3 GPS Clock Distribution CCA, A3.

The GPS CCA provides GPS-synchronized 44.1kHz sample rate conversion for the -2 digital input. The digital output is routed to the 5111 audio card. The GPS CCA is used only with the -2 version.

1-4 PERFORMANCE CHARACTERISTICS.

Table 1-2 contains the electrical, mechanical, and environmental specifications for the 800I HD Importer.



- ¹ - THE AVAILABLE AUDIO CARDS OFFER DIFFERENT FEATURES. THE NUMBER OF ANALOG, DIGITAL AND OTHER INPUTS AND OUTPUTS IS DEPENDENT ON WHICH AUDIO CARD IS USED.
- ² - THE EXTERNAL 10 MHZ REFERENCE AND GPS CLOCK CCA A3 ARE REQUIRED ONLY FOR THE -2 VERSION USING THE ASI5111 AUDIO CARD. THE ORBAN 1101 AUDIO CARD (-1 VERSION) MAY USE AN EXTERNAL OR AN ON-BOARD 10 MHZ SOURCE.

Figure 1-2. Importer Simplified Block Diagram.

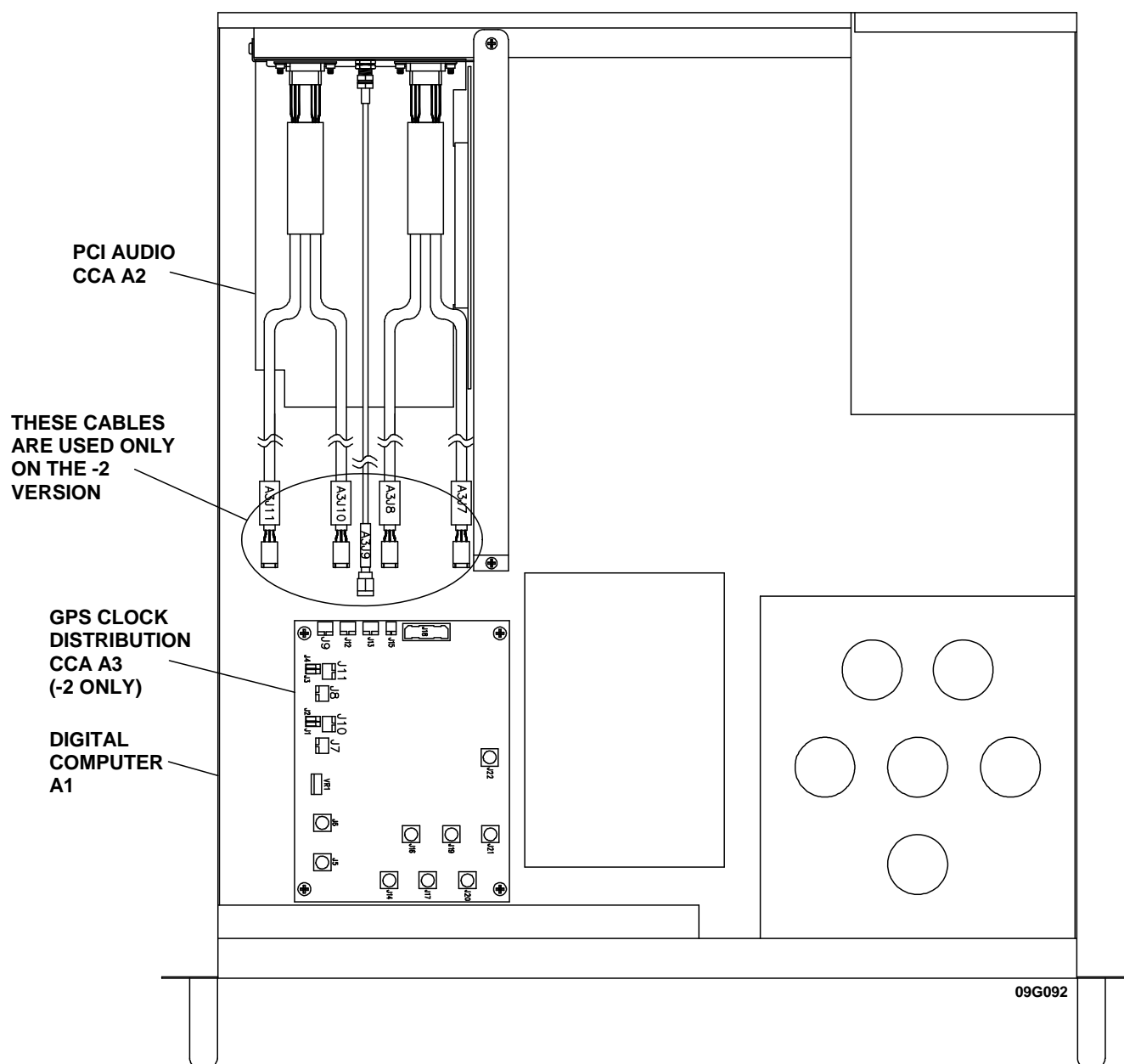


Figure 1-3. Assembly Locator Diagram.

Table 1-2. Technical Characteristics.

Characteristic	Performance
<u>Electrical</u>	
Input Power:	100-240 Vac; 47-63 Hz; universal voltage input; no voltage range switching required.
<u>Mechanical</u>	
Size:	16.79 inches (426.7 mm) wide centered on a 19 inch wide (482.6 mm) rack-mounted panel; 3.46 inches (87.88 mm) high; 18.9 inches (480.1 mm) deep.
Weight:	Approx. 24 lbs. (10.9 kg).
<u>Environmental</u>	
Temperature Range:	+32 to +104 degrees F (0 to +40 degrees C), operating.
Relative Humidity Range:	10 to 85% at +104 degrees F (+40 degrees C), non-condensing.
For PCI audio card specifications, refer to datasheet or user manual in Section 8, Supplemental Data or included in the shipment.	

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SECTION 2 - INSTALLATION

2-1. INTRODUCTION

This section will guide the user in the unpacking, inspection, selection of internal options, and installation of the 800I HD Importer. Refer to Figure 2-1 for chassis dimensions.

2-2. UNPACKING AND INSPECTION

2-2.1 Domestic Shipments.

Remove the Importer from its shipping crate and packing material. Remove top cover from the Importer by removing the retaining screws.

Inspect the equipment for loose screws and fasteners. Ensure that circuit cards are properly installed, and cable and wiring connections are tight. Replace top cover and tighten fasteners when inspection is complete. If any item is damaged in transit, note the damage on the shipping documents and immediately file a freight claim. All boxes and packing material should be retained for the freight inspector.

When the Importer is shipped as a stand-alone item, perform the items outlined in the following paragraphs.

When the Importer is shipped as an integral part of a transmitter, the fuse rating, rack mounting, and appropriate internal options are selected at the factory. The user should skip ahead to Input Connections, paragraph 2-4.2.

2-2.2 International Shipments.

The Importer international shipping installation instructions are identical to those for domestic shipment. Refer to instructions in Paragraph 2-2.1 for unpacking and inspection.

2-3. INTERNAL OPTIONS

Prior to installing the Importer, examine the following paragraphs to ensure the internal options are set for the desired configuration.

2-3.1 AC Power.

The Importer contains a universal power supply that operates on any voltage from 100 - 240 VAC. No switches or jumpers are needed to accommodate this input range.

2-3.2 Sample Rate Conversion.

The -2 Importer is shipped from the factory with digital audio sample rate conversion on GPS Clock Distribution CCA A3 enabled. If the setting needs to be changed, refer to Table 2-2 for a description of the settings. CCA A3 is not used on the -1 version.

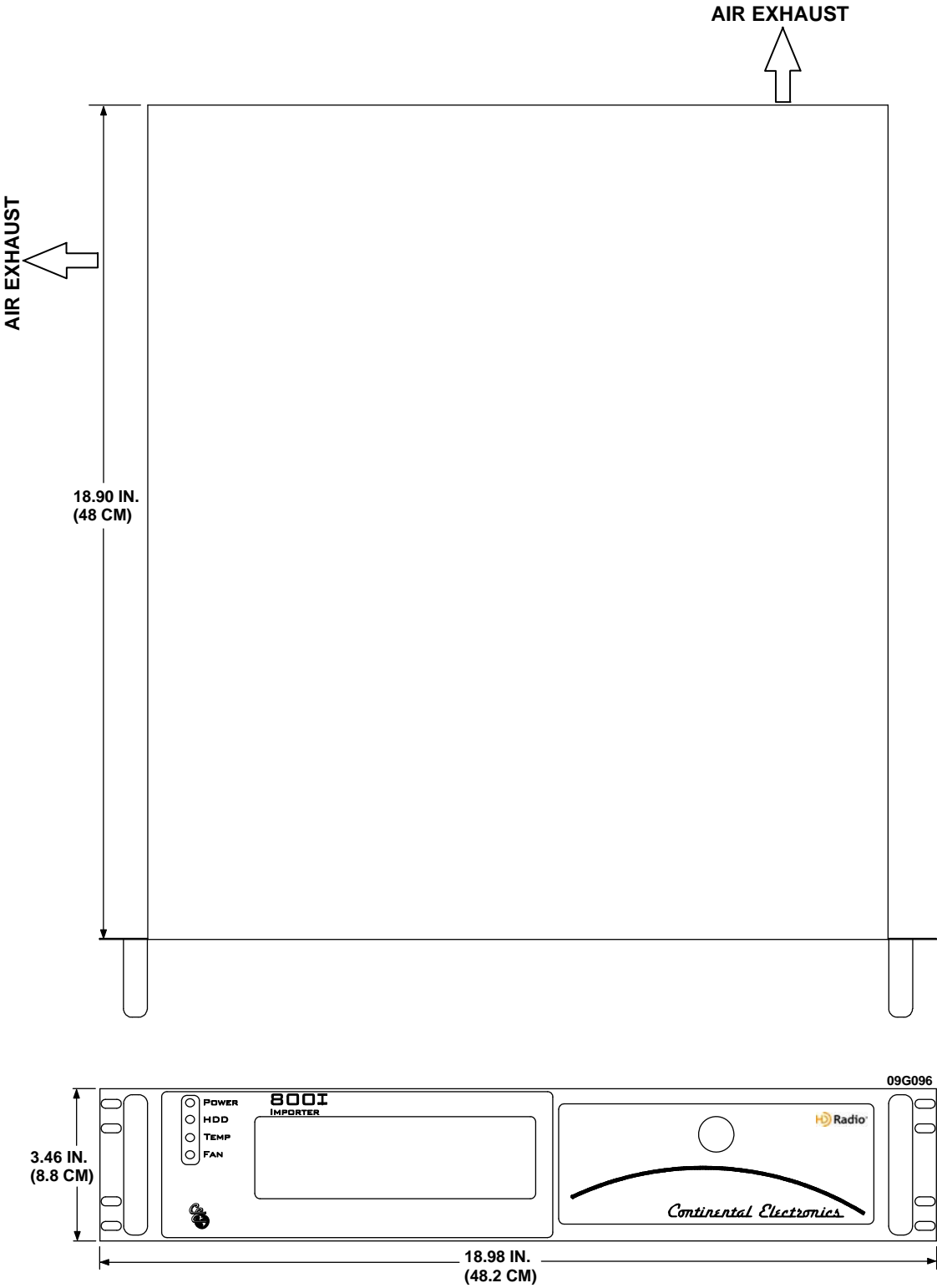


Figure 2-1. Importer Outline and Installation Drawing.

2-4. INSTALLATION

Perform the instructions in the following paragraphs to install the Importer in the equipment rack and make the necessary interface connections.

WARNING **HIGH VOLTAGE HAZARD**

ENSURE AC POWER IS REMOVED FROM THE IMPORTER BEFORE SERVICING. FAILURE TO COMPLY MAY RESULT IN DEATH OR INJURY TO PERSONNEL.

2-4.1 Rack Mounting.

The Importer requires 2U (3.5 in.) of vertical space. Install the Importer into a standard 19-inch rack using the included slide assembly.

2-4.2 Input Connections.

For the -1 version only, connect the supplied “octopus” cable (eight XLR connectors, one BNC connector and one DB-25 connector) to the rear panel DB-25 connector. The following paragraphs outline connections made to the Importer from external power and signal sources. Refer to Figure 2-2 and Table 2-1 for a summary of all front/rear panel connections.

NOTE

It is highly recommended that the Importer be connected to an uninterruptible power supply (UPS) with surge protection to maintain operation during power outages and provide protection against voltage spikes.

2-4.2.1 AC Power. Mains power is applied to the port labeled AC INPUT. The voltage applied to this connector should be in the range of 100 to 240 VAC at a frequency of 47 to 63 Hz. No switches or jumpers are needed to accommodate this input range. Connect the power cord female end to the AC INPUT connector on the rear of the Importer. Plug the male connector end into a compatible power source (refer to Figure 2-3). Also, see Paragraph 2-3.1.

2-4.2.2 Digital Inputs. For the -1 version, the two digital inputs are via the “octopus” cable. The -1 inputs are routed to the 1101 audio card for 44.1 kHz fixed-rate sampling. For the -2 version, the one digital input is via XLR connector AES1 (W4J1).

Connector AES2 (W4J2) is not used. The -2 input is routed to GPS/Clock Distribution CCA A3 for 44.1 kHz fixed-rate sampling.

2-4.2.3 GPS Input. For the -1 version, the BNC connector located on the “octopus” cable or rear panel provide for the optional external 10 MHz clock input. The external clock, if used, is routed to the 1101 audio card. For the -2 version, an SMA connector (W3J3) provides for the required external 10 MHz clock input. This clock signal is routed to GPS/Clock Distribution CCA A3.

2-4.2.4 Analog Inputs. For the -1 version, the two left and right channel inputs are via the “octopus” cable. For the -2 version, the two left and right channel inputs are via a DB-9 connector. The analog inputs are multiplexed with the digital inputs and routed to the motherboard for output on the LAN.

2-4.2.5 Motherboard Inputs. The motherboard offers rear panel inputs for the following:

1. Mouse (PS/2; green)
2. Keyboard (PS/2; purple)
3. Two LAN ports (RJ-45) for Importer control
4. Microphone (1/8-inch TRS; pink)
5. Line In (1/8-inch TRS; light blue; for audio sources)

2-4.3 Output Connections.

The following paragraphs outline connections made from the Importer to external equipment. Refer to Figure 2-2 and Table 2-1 for a summary of all front/rear panel connections.

2-4.3.1 Digital Output. For the -1 version, the two digital outputs are via the “octopus” cable. For the -2 version, the one digital output is via XLR connector AES1 OUTPUT (W5J3). These are not the main Importer audio/data outputs. These connectors are used only to monitor the audio card’s digital output. The main output is via one of the two LAN ports.

2-4.3.2 Motherboard Outputs. The motherboard offers rear panel outputs for the following:

1. Line Out (1/8-inch TRS; lime; for headphone/speaker)
2. COM1 (DB-9; for serial devices)
3. VGA (DB-15; for monitor)
4. LPT1 (DB-25; for parallel devices)
5. LAN port (RJ-45) for main Importer audio/data output
6. USB 2.0 ports (type A; for host control functions)

2-4.3.3 Front Panel Outputs. The front panel offers two USB 2.0 ports (type A; for host control functions).

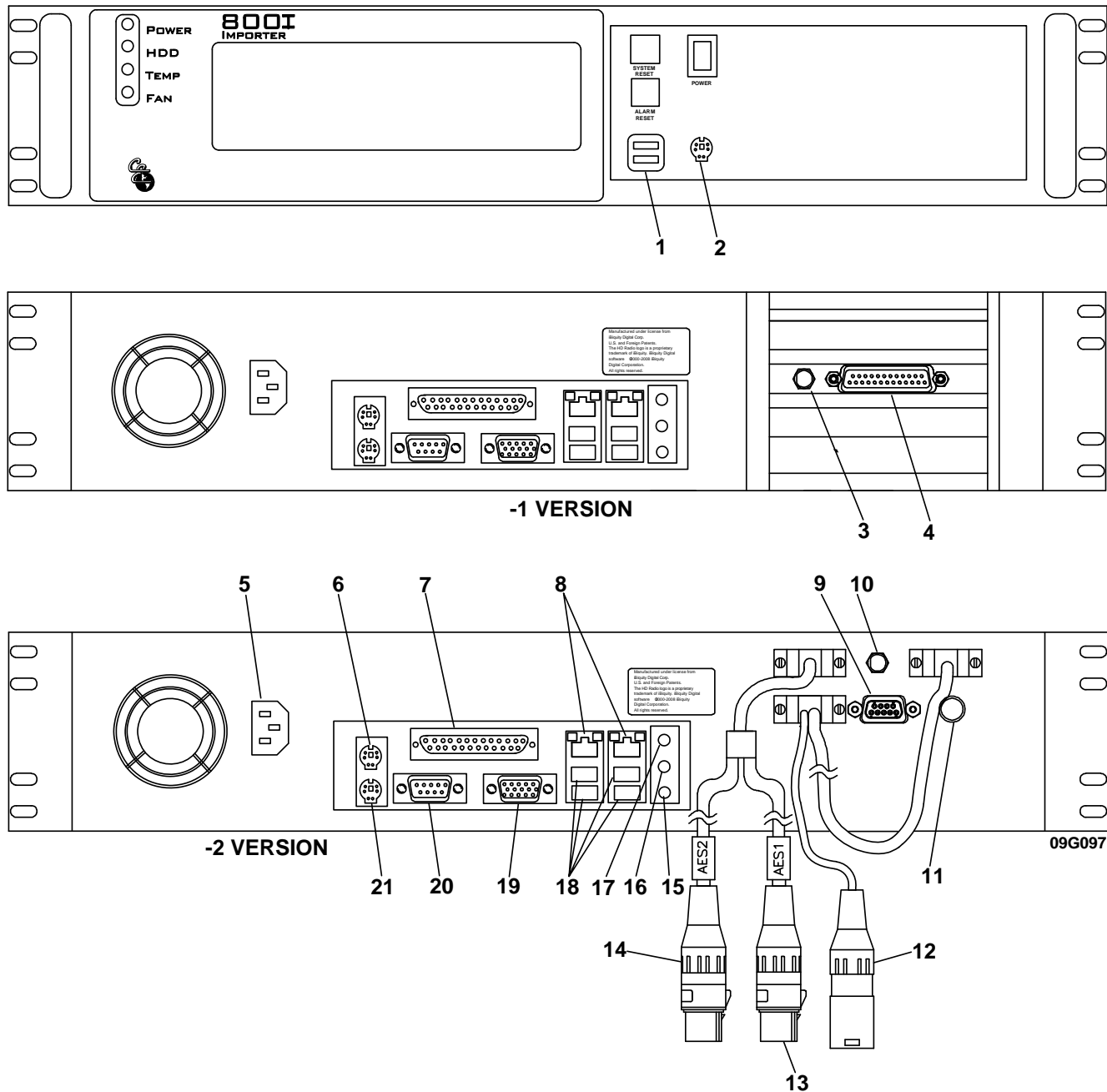


Figure 2-2. Front/Rear Panel Connector Location Diagram.

Table 2-1. Front/Rear Panel Connectors.

Index No.	Connector	Function
1	USB 2.0 ports	Type A, for connection to function as a host to peripheral devices.
2	Keyboard port	PS/2, for connection to a keyboard.
3	10 MHz input	(-1 only) BNC, for 10 MHz GPS reference clock signal input.
4	Signal input/output	(-1 only) DB-25, for all analog/digital (AES/EBU) input/output and 10 MHz GPS reference clock signal input.
5	AC power input	AC power input connector. Remove the attached ac power cord from its receptacle to turn the Importer off.
6	Mouse port (Green)	PS/2, for connection to a mouse.
7	Parallel connector	DB-25, for connection to a parallel printer, scanner, or other devices.
8	LAN ports	RJ-45, for Importer control and multiplexed audio and data input/output.
9	Analog input/output	(-2 only) A2J2, DB-9, for balanced mono/stereo analog input and output.
10	10 MHz input	(-2 only) W3J3, SMA, for 10 MHz GPS reference clock signal input.
11	Microphone input	(-2 only) A2J3, ¼-inch TRS, for connection to a microphone.
12	AES output	(-2 only) W5J3, XLR, for HD AES/EBU digital audio output.
13	AES1 input	(-2 only) W4J1, XLR, for HD AES/EBU digital audio input (channel 1).
14	AES2 input	(-2 only) W4J2, XLR, for HD AES/EBU digital audio input (channel 2).
15	Microphone port (Pink)	⅜-inch TRS, for connection to a microphone.
16	Line Out port (Lime)	⅜-inch TRS, for connection to a headphone or speaker.
17	Line In port (Light Blue)	⅜-inch TRS, for connection to a tape, CD, DVD player, or other audio sources.
18	USB 2.0 ports	Type A, for connection to function as a host to peripheral devices.
19	VGA connector	DB-15, for connection to a VGA monitor.
20	Serial connector	DB-9, COM1, for connection to serial devices.
21	Keyboard port (Purple)	PS/2, for connection to a keyboard.

2-5 INITIAL OPERATION.

The following information will guide the user in operation of the Importer.

2-5.1 Turn Importer On.

Place the Importer in operation and turn it on using the following steps:

- 1. Confirm that all connections and options have been correctly selected as outlined in the previous paragraphs.
- 2. Connect the Importer power cable to a power source by plugging it into an ac power outlet.

- 3. Press momentary POWER switch located behind front panel access door.
- 4. Wait for the Importer to boot. When the Importer finishes its internal self-test, the front panel LEDs show the operational status of the Importer.

2-5.2 Turn Importer Off.

- 1. Perform system shutdown via the desktop Start button or
- 2. Press momentary POWER switch located behind front panel access door.

The Importer can be left on at all times if there is no reason to remove AC power. There are no items internal to the Importer, such as crystal ovens, that require standby power.

Table 2-2. Importer Jumper Configuration Data.

Jumper	Pin to Pin	Function
GPS Clock Distribution CCA - A3 (202223-1)(-2 version only)		
J1-J2	*1-2	Enables digital audio sample rate conversion at U5 for AES input No.1 (channel 1).
	2-3	Disables digital audio sample rate conversion at U5 for AES input No.1 (channel 1).
J3-J4	*1-2	Enables digital audio sample rate conversion at U6 for AES input No.2 (channel 2).
	2-3	Disables digital audio sample rate conversion at U6 for AES input No.2 (channel 2).

Note: (*) is the default jumper setting.

2-6. INTRA-UNIT WIRING

A wiring list is provided for the -2 version to facilitate reconnection of loose cabling/wiring and for troubleshooting purposes. Intra-unit wiring is defined as wiring within a single unit. This wiring list is identified in Table 2-10 followed by the wiring list.

Table 2-3. Index of Wiring Lists.

Wire List No.	Rev.	Description
WL200396-2	1	Importer, 800I

INTRA-UNIT WIRING LIST				DATE: 29 OCTOBER 2009	
WIRELIST NO: 200396-2					
800I IMPORTER, ASI5111, CEC SRC					
ECN NO:				REV: 1	
ASSY NO: 200396-2				REVISED:	
PL NO: 200396-2					
SCHEMATIC: 200397					
WIRE NO	WIRE SIZE	FROM	TO	WIRE LENGTH	REMARKS
W1		W1P1	A3J7		CHANNEL 1 IN
W1		W1P2	A3J8		CHANNEL 2 IN
W1		W1J1	REAR PANEL BRACKET		
W2		W2P1	A3J10		CHANNEL 1 OUT
W2		W2P2	A3J11		CHANNEL 2 OUT
W2		W2J2	REAR PANEL BRACKET		
W3		W3P1	A3J9		10MHZ IN TO SRC
W3		W3J3	REAR PANEL BRACKET		10MHZ FROM EXPORTER
W4		DO NOT INSTALL, SHIPS WITH UNIT			AES CHANNEL 1 INPUT FROM CUSTOMER
W5		W5P2	W2J2 (REAR PANEL)		CHANNEL 1 AND 2 OUT TO AUDIO CARD
		W5P1	A2J1		LOCKED AUDIO
		W5J3			WAV AUDIO OUTPUT

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SECTION 3 - OPERATION

3-1. GENERAL

This section of the Operation and Maintenance Manual describes the 800I HD Importer controls and indicators, and initial operation and shutdown of the unit.

3-2. CONTROLS AND INDICATORS

Control, metering and status indication is accomplished through the use of Web browser screens, and front and rear panel controls and indicators. The Main browser screen, Figure 3-2, is displayed upon a successful Internet connection to the Importer. Screen navigation is accomplished using a mouse or touchpad. Select the screen tab at the bottom of each screen to display the desired screen.

Panel indications include 16 front panel LEDs, and 2 rear panel LAN port link and activity LEDs. Two pushbuttons, Reset and Diag(nostics), are located on the rear panel.

Refer to Figure 3-1 and Table 3-1 for a description of the operating controls and indicators found on the front and rear panels of the Importer. Figure 3-1 shows the front and rear panel controls and indicators. Table 3-1 identifies the function of each control and indicator.

Refer to Figures 3-2 thru 3-15 and Tables 3-2 thru 3-15 for a description of the operating controls and indicators found on the browser screens. Figures 3-2 thru 3-15 show the screen. Tables 3-2 thru 3-15 identify the function of each control and indicator.

3-2.1 Front Panel.

The front panel has the following controls, indicators and connectors, from left to right:

1. POWER LED indicator
2. HDD LED indicator
3. TEMP LED indicator
4. FAN LED Indicator
5. Two Type A USB 2.0 ports
6. SYSTEM RESET switch
7. ALARM RESET switch
8. Momentary POWER switch

3-2.2 Rear Panel.

The rear panel has the following controls, indicators and connections, from left to right:

1. AC power input (100-240 volts, 47-63 Hz)
2. Dual PS/2 connectors for keyboard and mouse
3. DB-25 connector for parallel devices

4. DB-9 COM1 connector for serial devices
5. DB-15 connector for VGA monitor
6. Dual RJ-45 LAN ports
7. Four Type A USB 2.0 ports
8. 1/8-inch TRS Line In jack
9. 1/8-inch TRS Line Out jack
10. 1/8-inch TRS microphone jack
11. 1/4-inch TRS microphone jack
12. SMA connector for 10MHz GPS reference clock signal input (-2 only)
13. DB-9 connector for balanced stereo analog output (-2 only)
14. Two XLR connectors for HD AES/EBU digital audio input (AES1 and AES2) (-2 only)
15. One XLR connector for HD AES/EBU digital audio output (-2 only)
16. DB-25 connector for connection of an included "octopus" cable that provides analog/digital input/output and external clock input (-1 only)
17. BNC connector for external clock input (-1 only)

3-3. OPERATING PROCEDURES

3-3.1 User Interface.

The user interface consists of 17 primary screens displayed on a remote computer using an Internet connection and a Web browser.

3-3.2 Operation Screens.

The Importer contains a graphical user interface (GUI) that is accessed over a LAN connection. It is designed to be simple to use and easy to navigate. The operator can see the operational parameters of the Importer on a remote computer display.

This section will give the basic operating instructions for the GUI. It is best to read this section with an operating Importer nearby so that the material can be verified and better understood.

Each screen is designed to control or monitor a particular class of functions that are related in some way.

3-3.2.1 Main Screen. When the Importer is turned on, it performs a self-test. Upon a successful self-test, the Main screen, Figure 3-2, is displayed once the remote computer connects to the Importer.

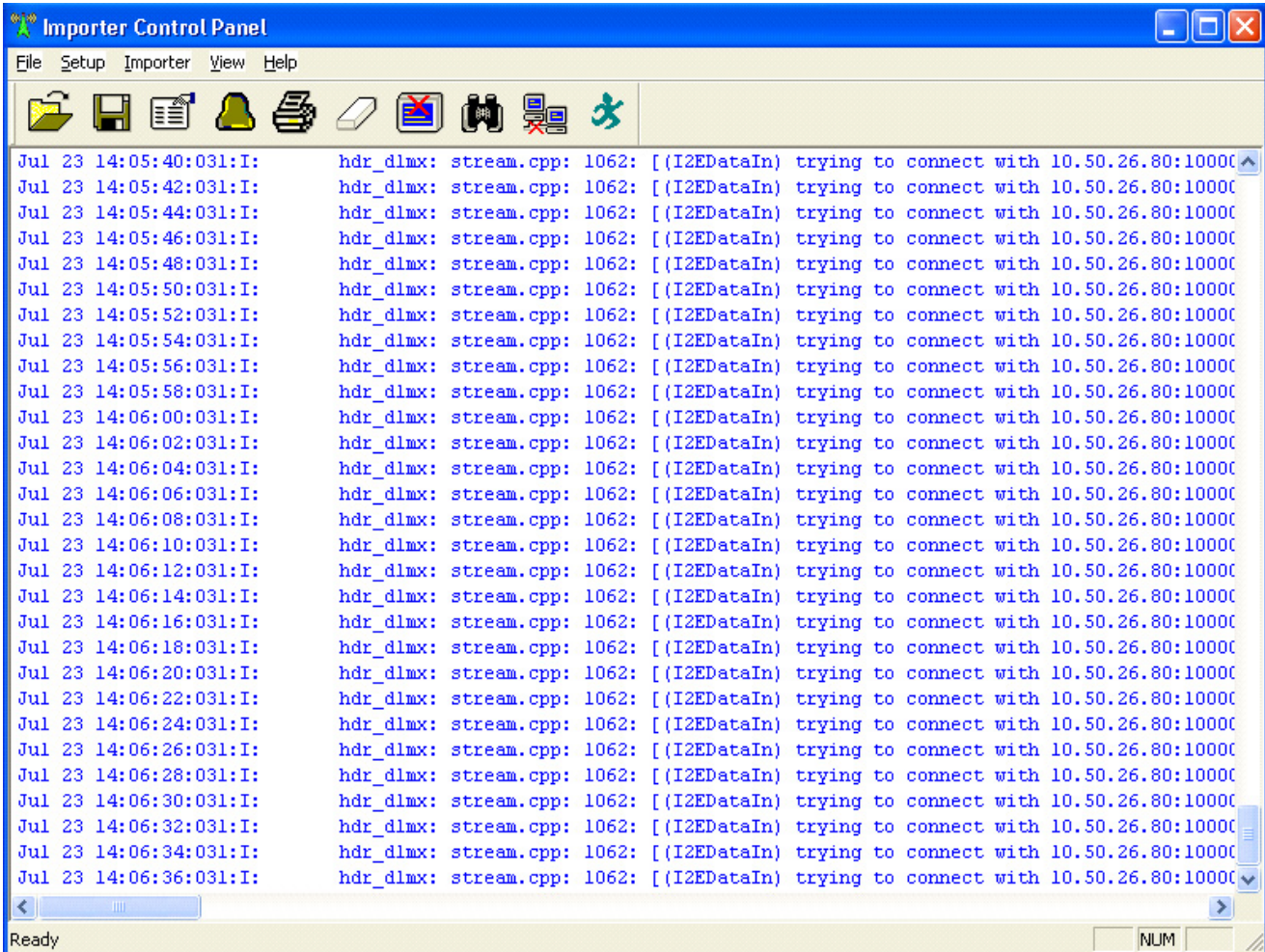
At any point, selecting the Main tab will return the display to the Main screen. This screen contains the basic operating indicators of the Importer (status LEDs, detected messages and errors, etc.). This screen should normally be displayed after all adjustments have been completed.



3-2

Table 3-1. Front/Rear Panel Controls and Indicators.

Index No.	Control or Indicator	Function
1	<u>Status LEDs</u>	
	POWER LED (Green/Red)	Green indicates power is applied to the Importer. Red indicates a redundant power supply module failure. Not lighted indicates power is not applied or there is a power problem.
	HDD LED (Green)	LED is on when hard drive is accessed for read/write functions.
	TEMP LED (Green/Red)	Green indicates interior temperature is within the upper operating limit. Red indicates interior has overheated (more than 122 deg F (50 deg. C). The audible alarm will sound.
	FAN LED (Green/Red)	Green indicates fans are operating normally. Red indicates a faulty cooling fan, and the alarm also sounds.
2	ALARM RESET switch	Whenever a fault occurs in the system (e.g., fan failure or chassis overheating) an audible alarm will sound. Press this switch to turn the alarm off.
3	SYSTEM RESET switch	Press to reboot the system.
4	Momentary POWER switch	Press to turn the system power on or off. Use the system shutdown or press this switch for a few seconds to turn off the system ATX power.
5	LAN port link/activity LED (Green)	Steady on indicates a good link. Flashes when receiving or transmitting data.
	LAN port speed LED (Green/Orange)	Off indicates 10Mbps. Orange indicates 100Mbps. Green indicates 1Gbps.



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Figure 3-2. Importer Control Panel Screen.

Table 3-2. Importer Control Panel Screen Controls and Indicators.

Control or Indicator	Function
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This screen allows the user to setup, start and stop the Importer, manage log messages, monitor communication link status and perform basic file management.

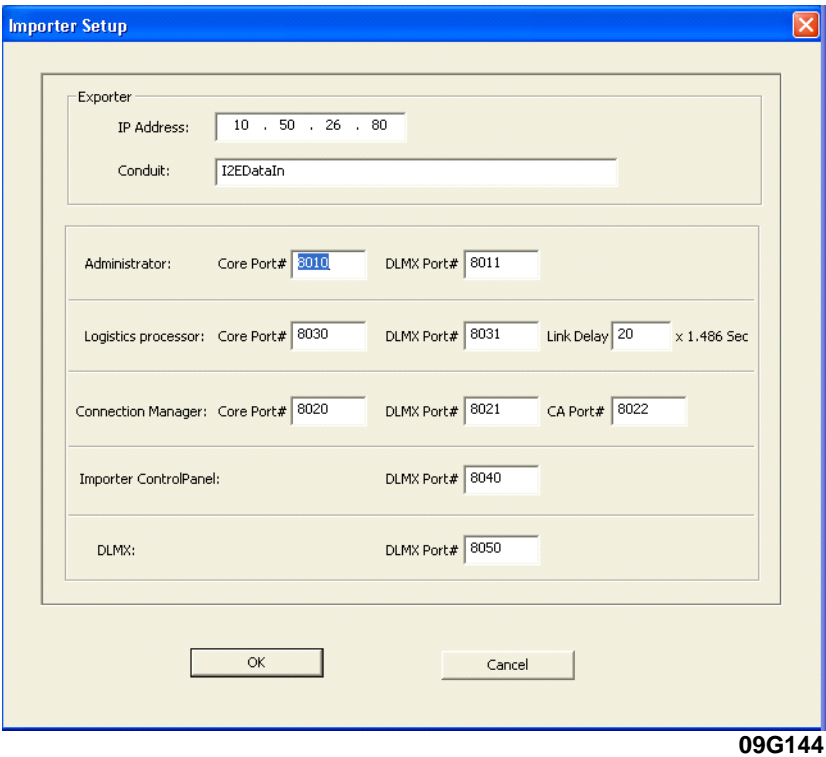


Figure 3-3. Importer Setup Screen.

Table 3-3. Importer Setup Screen Controls and Indicators.

Control or Indicator	Function
This screen is used to set communication configuration parameters for the Importer.	
<u>Exporter</u>	
The Exporter attributes set the Exporter IP address and the conduit name for communications between the Importer and Exporter.	
<u>Administrator</u>	
Core Port # attribute	Sets the TCP port number used to forward all external requests.
DLMX Port # attribute	Sets the UDP port number used to communicate with the Exporter.
<u>Logistics Processor (LP)</u>	
Core Port # attribute	Sets the TCP port number where the LP listens for data connections from the connection manager.
DLMX Port # attribute	Sets the UDP port number used for Exporter indication requests.
Link Delay attribute	Sets the buffering between the Importer and Exporter/Exciter. If Link Delay is 20, the Exciter buffers up to 30 (20 X 1.486) seconds worth of data before transmitting secondary service.

Figure 3-3. Importer Setup Screen - Continued

Table 3-3. Importer Setup Screen Controls and Indicators - Continued

Control or Indicator	Function
<u>Connection Manager (CM)</u>	
Core Port # attribute	Sets the TCP port number the CM monitors for any client login.
DLMX Port # attribute	Sets the UDP port number used to communicate with the data link manager.
CA Port #	Sets the port number used between the entitlement control message generator (ECMG) client for conditional access (CA) services.
<u>Importer Control Panel</u>	
DLMX Port # attribute	Sets the communications port number between the control panel and data link manager.
<u>DLMX</u>	
DLMX Port # attribute	Sets the communications port number between the data link manager and the Administrator, Connection Manager, Logistics Processor and Control Panel.
OK button	Select to accept changes.
Cancel button	Select to cancel changes.

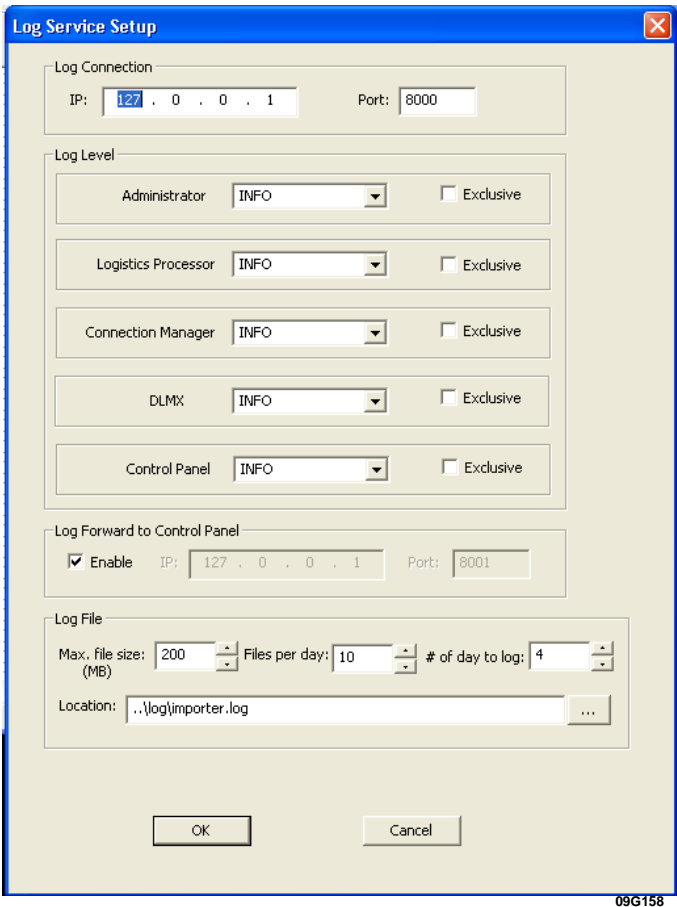


Figure 3-4. Log Service Setup Screen.

Table 3-4. Log Service Setup Screen Controls and Indicators.

Control or Indicator	Function
<u>Log Connection</u>	
IP attribute	Sets the IP address of the machine on which the logger is running.
Port attribute	Sets the port number where the various Importer components send the logging messages.
<u>Log Level</u>	
These attributes set the log level for the various Importer components. The choices for the level attribute are OFF, INFO, DEBUG1, DEBUG2, DEBUG3. The Exclusive attribute indicates whether all log messages are printed for the selected level and below (unchecked) or just for the level selected (checked).	
<u>Log Forward to Control Panel</u>	
Select Enable to allow log messages to be displayed on control panel.	

Figure 3-4. Log Service Setup Screen - Continued

Table 3-4. Log Service Setup Screen Controls and Indicators - Continued

Control or Indicator	Function
<u>Log File</u>	
These attributes set the maximum size of the log file before it is archived, the number of daily log files created, the number of days log files are created and the location where the log files are stored.	
OK button	Select to accept changes.
Cancel button	Select to cancel changes.

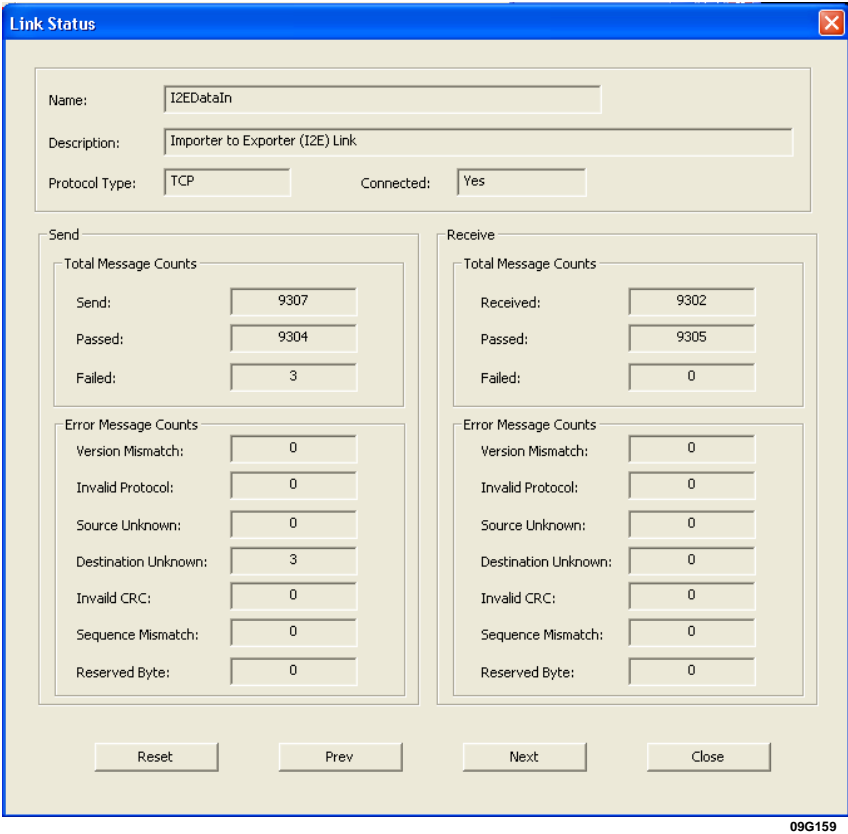


Figure 3-5. Link Status Screen.

Table 3-5. Link Status Screen Controls and Indicators.

Control or Indicator	Function
This screen displays the name and other attributes of the different communication links. Also, various send/receive message statistics and error counts for typical failures related to the selected communications link are displayed.	
Reset button	Select to set all Total Message Counts and Error Message Counts to zero.
Prev button	Select to display the previous communications link.
Next button	Select to display the next communications link.
Close button	Select to close this screen.

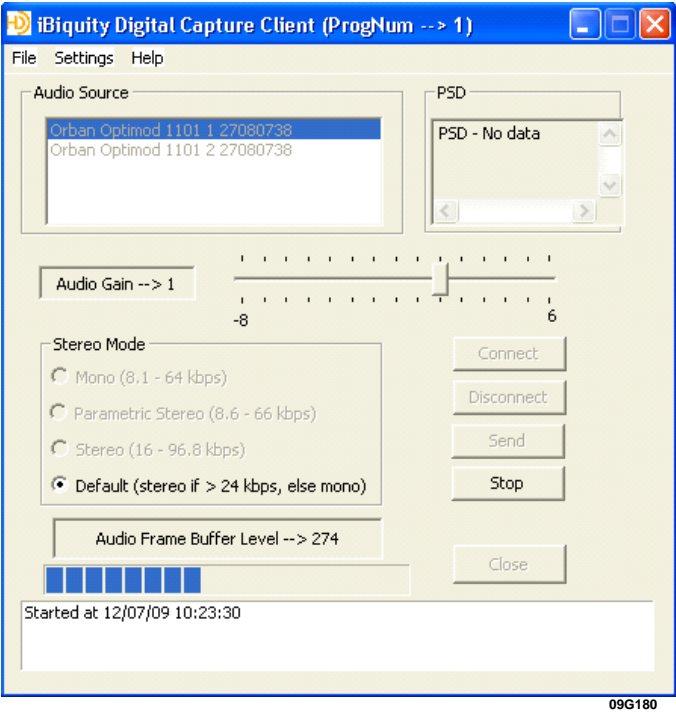


Figure 3-6. Digital Capture Client Screen.

Table 3-6. Digital Capture Client Screen Controls and Indicators.

Control or Indicator	Function
This screen is used to capture audio samples from any DirectX compatible audio card.	
Select the desired audio card and channel from the Audio Source box. Select the Connect button, if active, then select the Send button to start transmission.	
The progress bar and display box will indicate the amount of audio in the client’s audio buffer. The information display box will indicate the time the client started sending data to the Importer. In addition, the information display box will also indicate other events that occur. For example, if the TCP connection to the Importer is lost and the internal buffers fill up, a “dropping audio” message is displayed.	
The Digital Capture Client has the ability to accept PSD as ID3 tags or as HDP packets through a UDP connection. If an external application is sending PSD information to the Digital Capture Client, the PSD display box will show the last message received.	
The Stereo Mode radio buttons allow the user to select the desired stereo mode. The Audio Gain slide bar allows the user to set the desired gain adjustment to be applied at the receiver.	
The File menu allows the user to manually connect or disconnect to the Importer. The Settings menu allows the user to edit information in the configuration file.	
Select the Disconnect button to sever the link to the discrete data source. Select the Stop button to stop transmission, while still maintaining the link. Select the Close button to close this screen.	

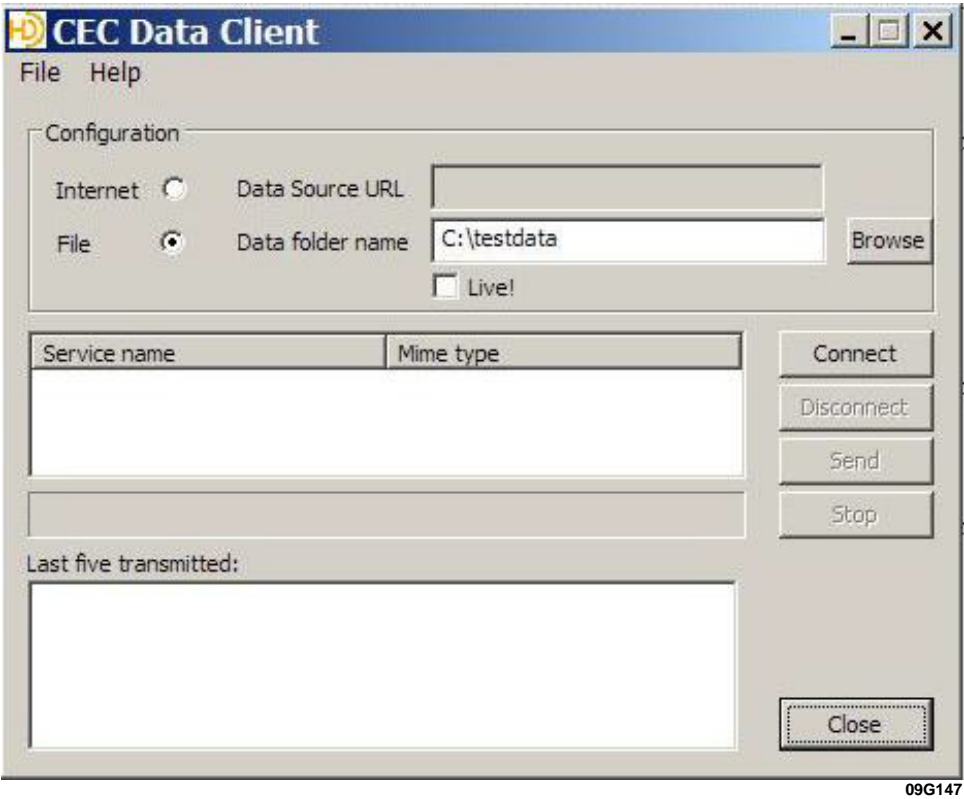
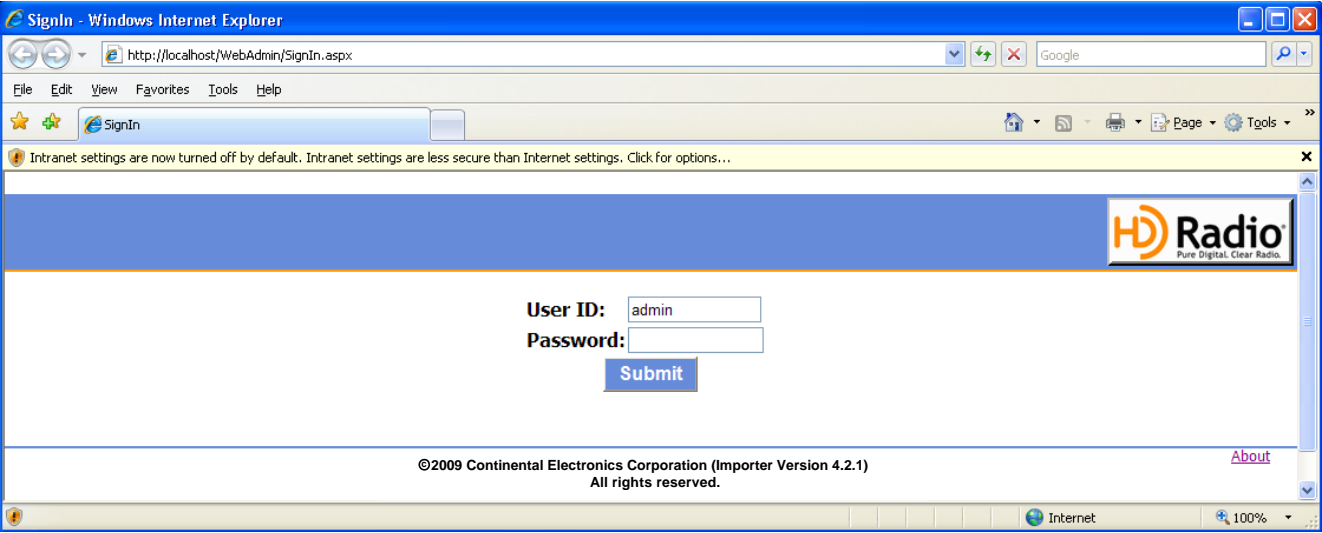


Figure 3-7. Data Client Screen.

Table 3-7. Data Client Screen Controls and Indicators.

Control or Indicator	Function
<p>The Data Client is used to setup transmission of any type of discrete data packets as long as the data is formatted in the generic data client format.</p> <p>Select the File radio button as the source of the discrete data packet. (The Internet source function is not currently available). Enter the path where the data files are stored in the Data Folder Name box or use the Browse button to locate the file folder.</p> <p>Check the Live! box to pick the latest file in the folder. If no newer file arrives after the Data Client sends the data in the file, it sends the same file again. If the Live! box is not checked, the Data Client goes through all the files in the folder, starting with the oldest file and finishing with the newest file.</p> <p>When the data source configuration is complete, select the Connect button then the Send button to start transmission. When all files have been transmitted, the Data Client starts the cycle over.</p> <p>As each file is transmitted, the Service name and Mime type for that file is displayed. The last five files transmitted are also displayed.</p> <p>Select the Disconnect button to sever the link to the discrete data source. Select the Stop button to stop transmission, while still maintaining the link. Select the Close button to close this screen.</p>	

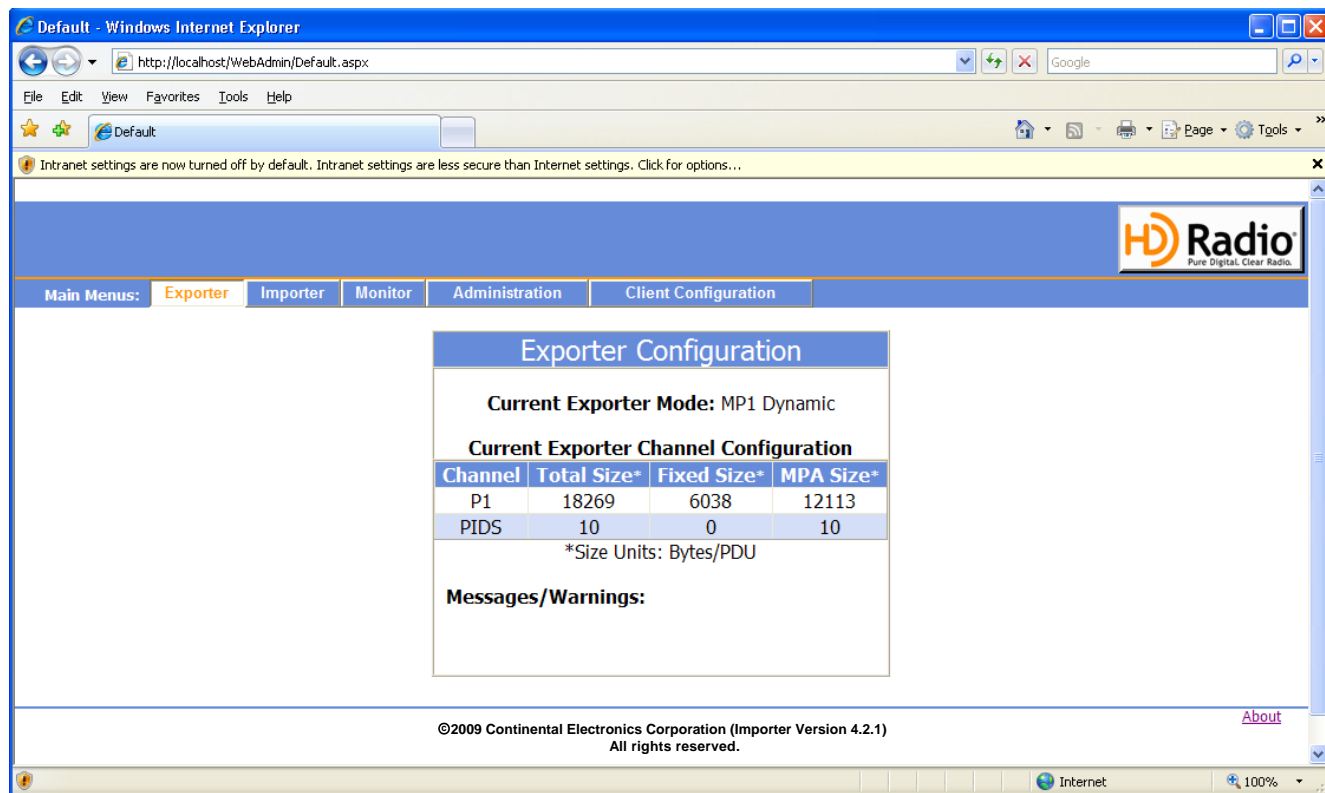


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Figure 3-8. Web Admin Screen.

Table 3-8. Web Admin Screen Controls and Indicators.

Control or Indicator	Function
Enter user identification (admin) and password (admin) to access advanced settings as shown on Figures 3-9 through 3-15.	



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Figure 3-9. Exporter Configuration Screen.

Table 3-9. Exporter Configuration Screen Controls and Indicators.

Control or Indicator	Function
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This screen displays the current Exporter Configuration. It provides information on the Service Mode as well as the channel configuration. It also indicates when the Exporter is not synchronized with the current Importer configuration. The message will attempt to provide a clue as to why the Importer is not matching the Exporter, such as bandwidth mismatch, service mode mismatch, etc.

Check that the Exporter is synchronized whenever a change is made to an Importer configuration. This should be done before attempting to broadcast any AAS services.

NOTE

Synchronizing the Exporter with the Importer may cause the Exporter to reboot, resulting in the main channel HD going off the air for about a minute.

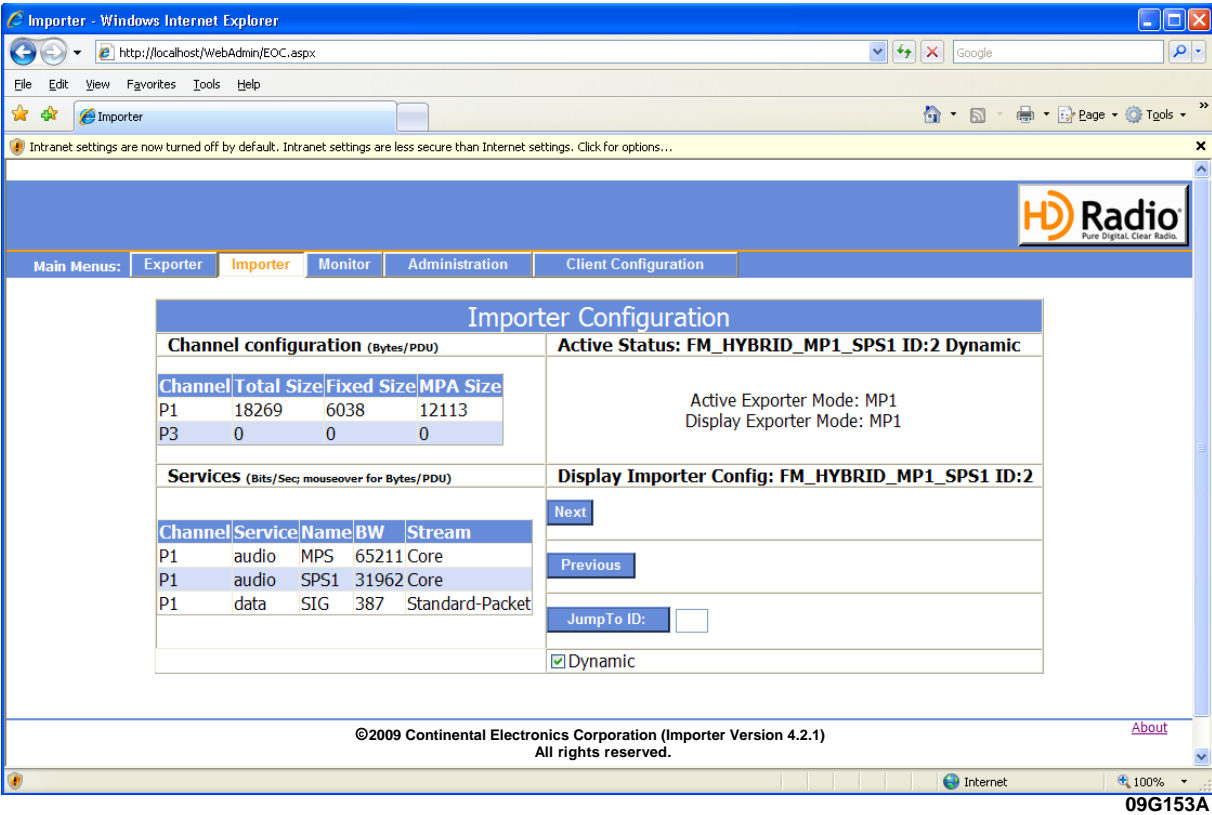


Figure 3-10. Importer Configuration Screen.

Table 3-10. Importer Configuration Screen Controls and Indicators.

Control or Indicator	Function
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This screen displays the Importer configurations and allows the user to change configurations. This screen displays the channel configuration as well as what services are associated with that configuration. All Importer configurations are viewable by selecting the Next or Previous buttons. The default screen always shows the current configuration. When the Next or Previous button is selected to show a configuration that is not the current configuration, a Set button is displayed to allow the user to change the Importer configuration. Checking the Dynamic box puts the Exciter into one of the dynamic configurations allowing changes in bandwidth configuration to occur without an Exciter reboot. This option is highly recommended.

Most of the columns in the Services group box are self-explanatory. Channel refers to the logical channel on which the service is being broadcast. Service defines the service type (i.e. audio or data). Name displays the name given to the service. BW gives the bandwidth, in terms of bits/sec, allocated to that service. The Stream column has a dual meaning, depending on the service type. If the type is audio, this column displays whether the audio being broadcast on the indicated logical channel is the core or enhanced stream. If the service type is data, this column displays the QoS level for that service and whether or not it is a packet-based or stream-based service.

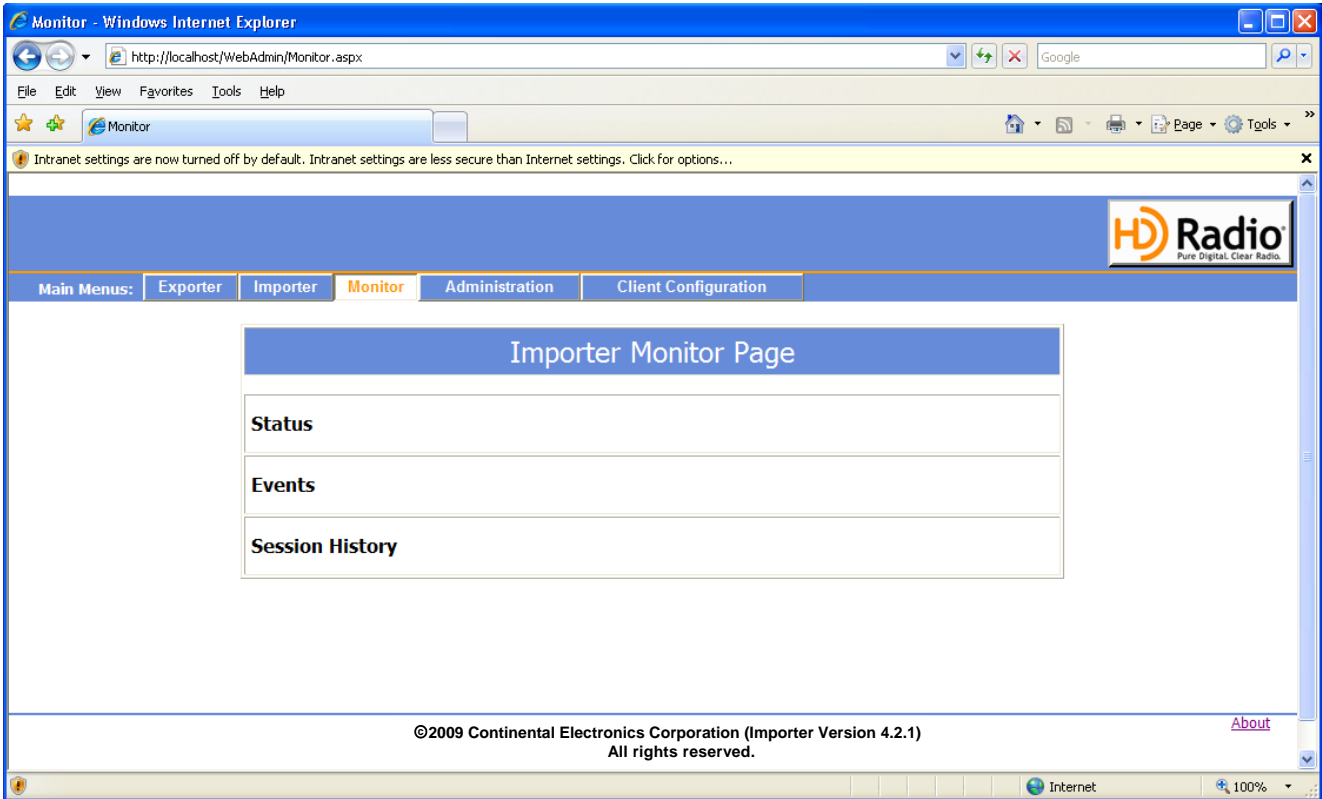


Figure 3-11. Importer Monitor Screen.

Table 3-11. Importer Monitor Screen Controls and Indicators.

Control or Indicator	Function
This screen is a place holder for future upgrades to the Importer API.	

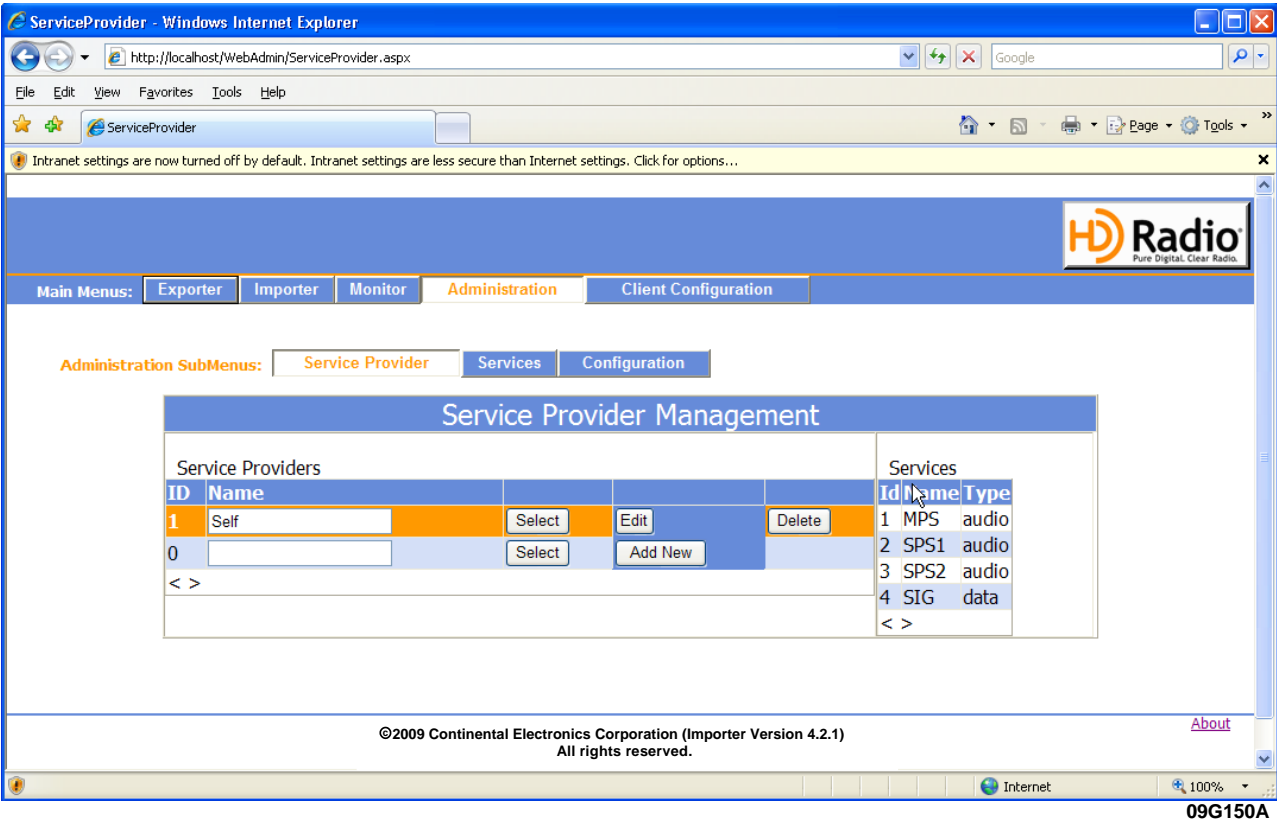


Figure 3-12. Admin - Service Provider Screen.

Table 3-12. Admin - Service Provider Screen Controls and Indicators.

Control or Indicator	Function
<p>This screen allows the user to view the current service providers and their associated services. It also allows the user to add, update or delete service providers.</p> <p>To edit the Name of a service provider, select the desired service provider and then select the Edit button. Now, enter the new name and select the Update button. The default service provider name, Self, cannot be modified.</p> <p>To add a service provider, select the Add New button. Now, enter the service provider name and select Save. Note, when entering the service provider name for Service Providers supplying data services or any conditionally accessed services, the service provider name must match the four-character name registered at the HD Registry in order for these services to be properly configured.</p>	

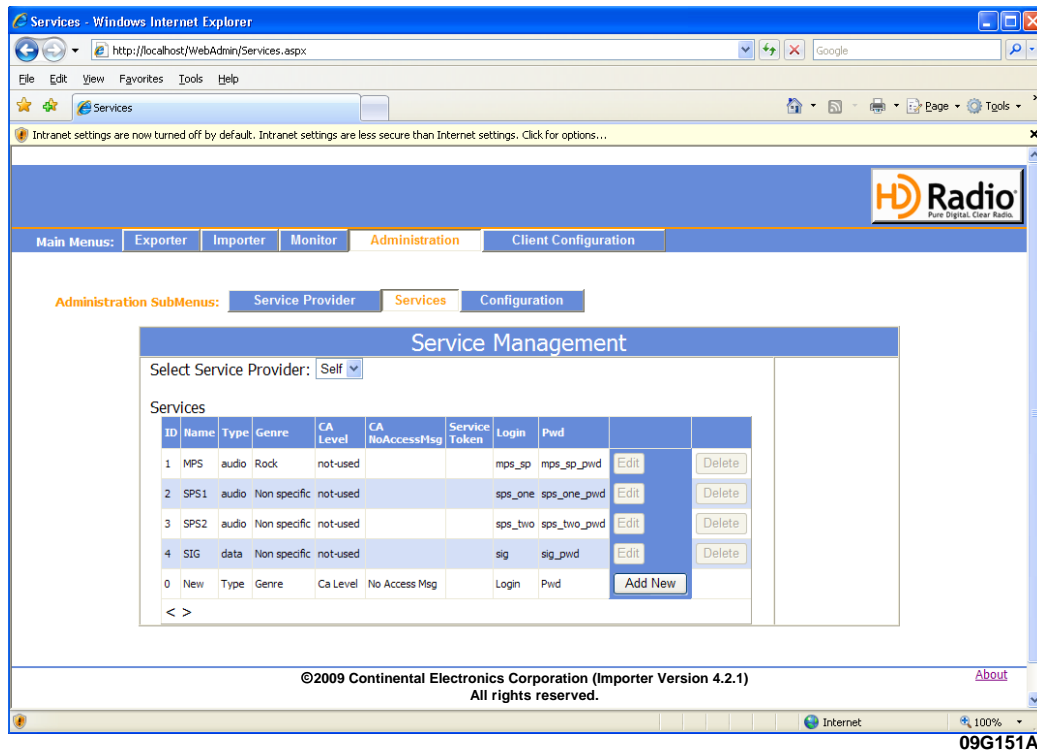


Figure 3-13a. Admin - Services Screen.

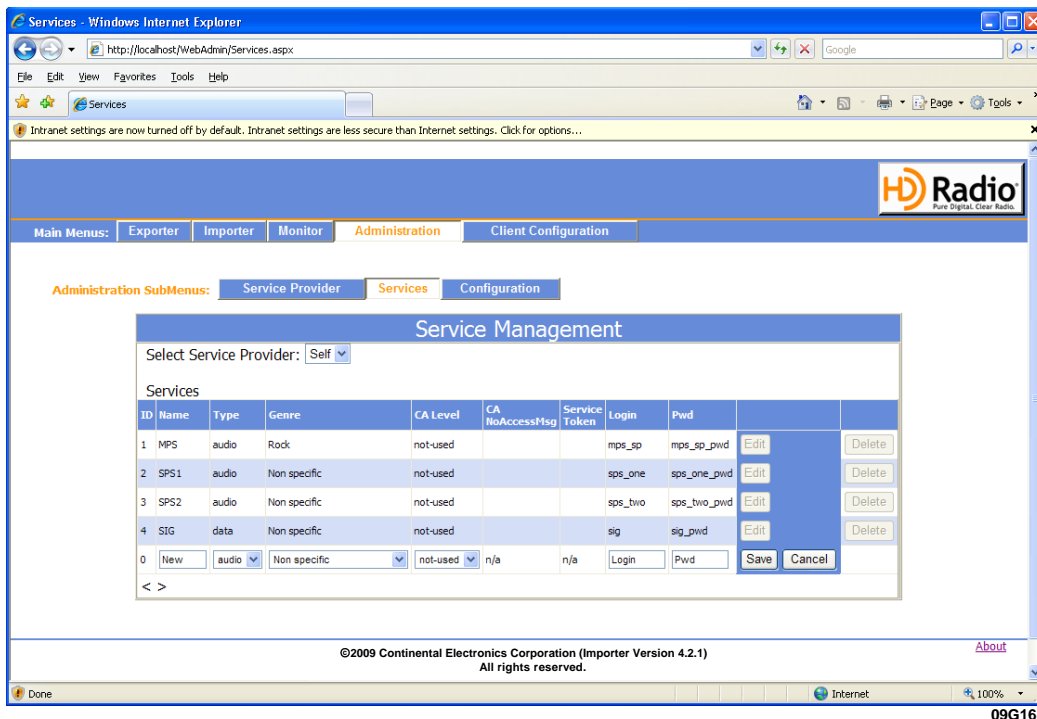


Figure 3-13b. Admin - Services Screen.

Table 3-13. Admin - Services Screen Controls and Indicators.

Control or Indicator	Function
<p>The screen shown in Figure 3-13a allows users to view all the services assigned to a particular service provider. In addition, a user can edit the information for an existing service, add a new service or delete an existing service. Note, before deleting a service, this service must be deleted from all the stored configurations.</p> <p>When Add New is selected, Figure 3-13b displays. The row of boxes and drop-down menus allows configuration of the new service. Once the service is configured, select Save.</p> <p>Notice the fields associated with Conditionally Accessed (CA) services:</p> <ul style="list-style-type: none">CA Level – Sets the CA level. There are three choices:<ul style="list-style-type: none">(1) Not Used, meaning the service is not a CA service and never will be.(2) Public, meaning the service should be treated as a CA service, but is currently free to air.(3) Private, meaning the service is a CA service. Once the service is defined as either non-CA (not used) or CA (public or private), it cannot be changed. To change the service, it must first be removed and then redefined.CA NoAccessMsg – Sets the text string displayed to the radio listener if the radio is not entitled to receive the CA programming.Service Token – Defines attributes associated with the service. The Service Token is obtained from iBiquity Digital and is required for all data services and any CA service. Service Tokens can be obtained from warrier@iBiquity.com.	

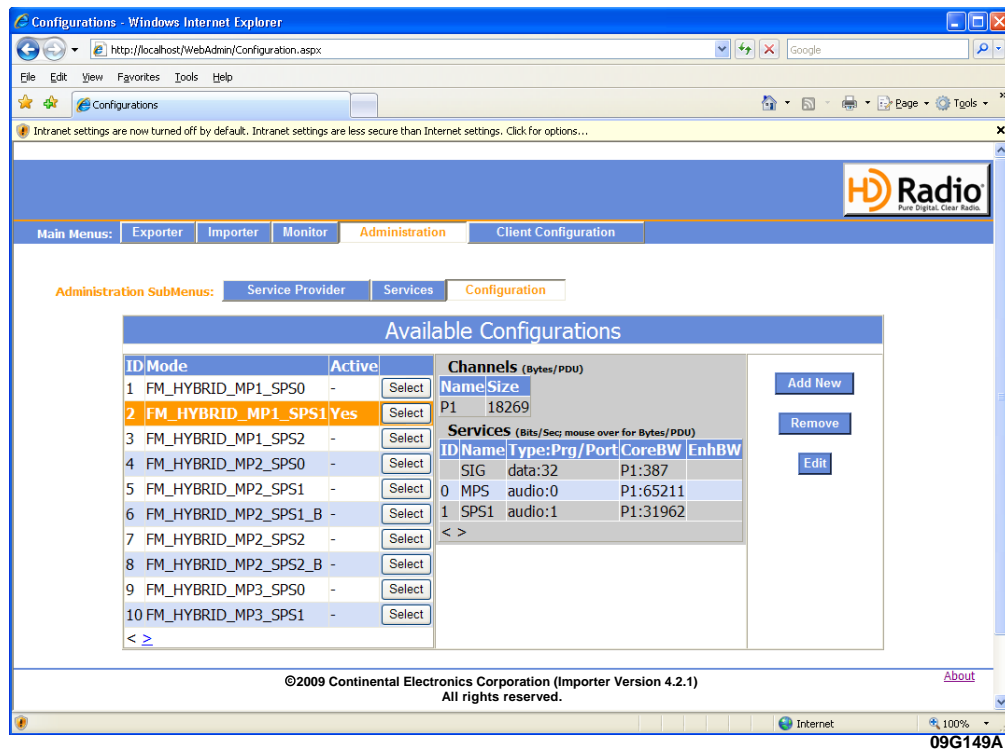


Figure 3-14a. Admin - Configuration Screen.

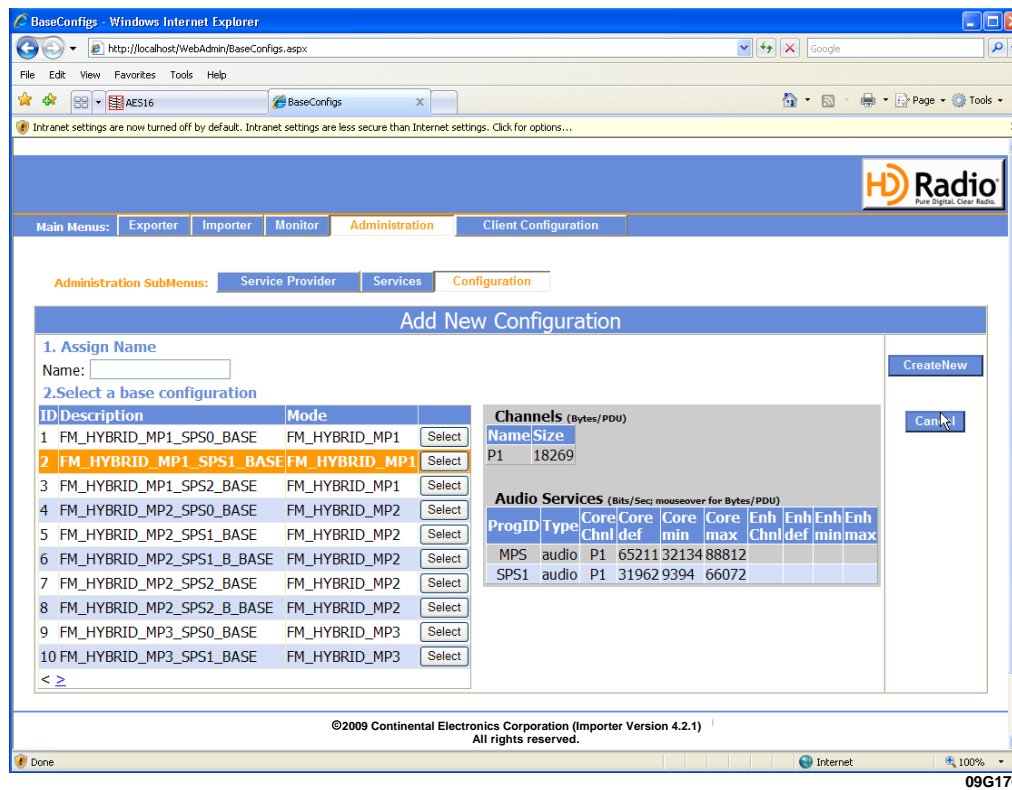


Figure 3-14b. Admin - Configuration Screen.

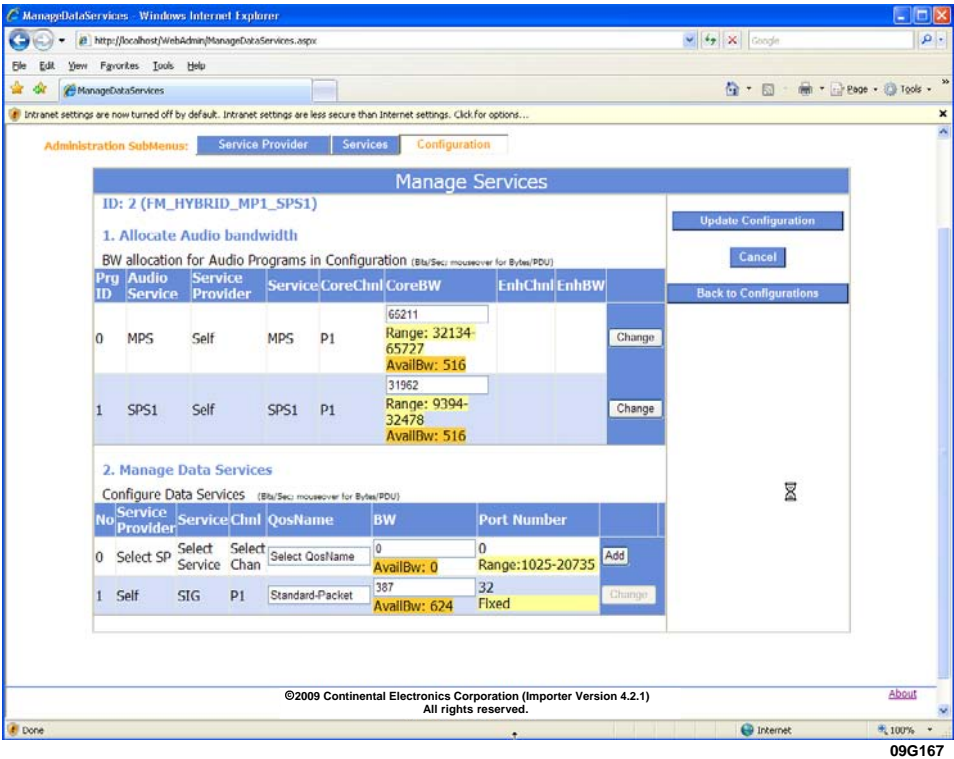


Figure 3-14c. Admin - Configuration Screen.

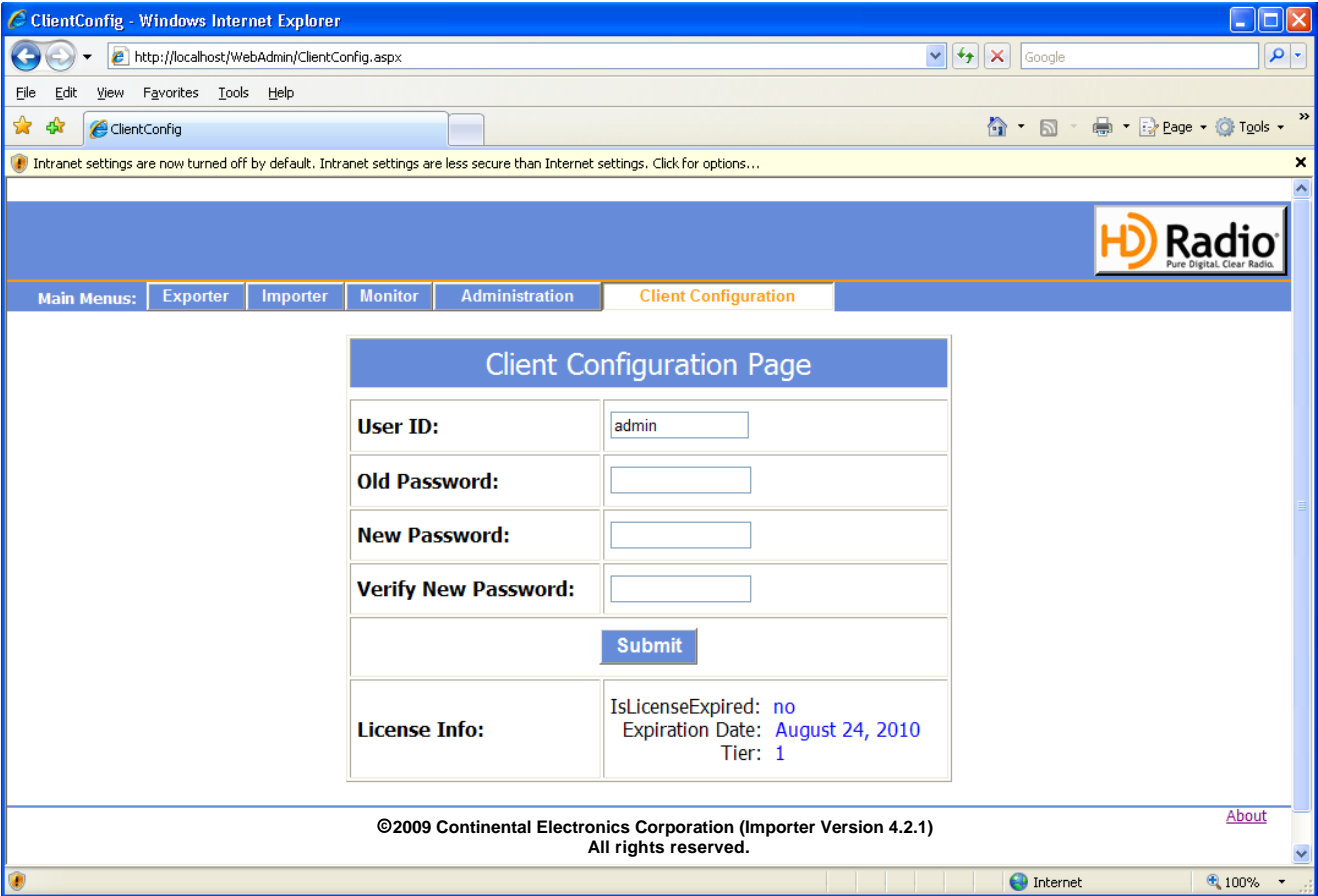
Table 3-14. Admin - Configuration Screen Controls and Indicators.

Control or Indicator	Function
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The screen shown in Figure 3-14a allows the user to manipulate (add, edit, or remove) the stored Importer configurations. Every Importer configuration originates with a base Importer configuration. A base Importer configuration essentially determines how many SPS audio services can be supported and to which logical channels they are assigned.

To add a new configuration, select the Add New button. Figure 3-14b displays. Enter the name of the configuration in the Assign Name box. Next, select a base Importer configuration. After entering a name and selecting the base configuration, select the CreateNew button. Figure 3-14c displays.

From this screen, the user can assign service providers and their associated services to the new configuration. In addition, the bandwidth allocation for each service can also be adjusted. Note, before data services can be added, bandwidth must be made available by adjusting the bandwidth of the audio services. Also, before the bandwidth of an audio service can be increased, bandwidth must be made available by reducing the bandwidth from the other services. When configuration is complete, select Update Configuration.



09G152A

Figure 3-15. Client Configuration Screen.

Table 3-15. Client Configuration Screen Controls and Indicators.

Control or Indicator	Function
This screen allows the user to change the password of the Web Admin client. It also displays the current status of the Importer license and when it expires.	

3-4. NORMAL TURN-ON.

Daily turn-on consists of the following steps:

1. Press momentary POWER switch located behind front panel access door.
2. Wait for the Importer to boot. When the Importer finishes its internal self-test, the front panel LEDs show the operational status of the Importer.

3-5. NORMAL TURN-OFF

1. Perform system shutdown via the desktop Start button or
2. Press momentary POWER switch located behind front panel access door.

3-6. EMERGENCY TURN-OFF

In the event of an emergency, remove power in any of the following ways:

1. Unplug power cable from AC outlet.
2. Turn off source power by opening power switch or circuit breaker.

SECTION 4 – THEORY OF OPERATION

4-1. INTRODUCTION

This section contains a description of the 800I HD Importer by functional area. Also contained in this section is the detailed theory of operation for each major assembly of the Importer, as appropriate. Some assemblies are purchased from third party vendors and detailed theory will not be provided. Refer to Figure 4-1 for an Exporter simplified block diagram and Schematic 200397.

The Importer adds supplemental audio/data, advanced applications services (AAS), and program-associated data (PAD) to the primary HD programming service, and manages content and delivery from other service providers. The Importer consists of the following major assemblies, refer to Figure 4-2 for physical location of assemblies:

- A1 Digital Computer
- A2 CCA, PCI Audio
- A3 CCA, GPS Clock Distribution (-2 only)

4-2. FUNCTIONAL DESCRIPTION

4-2.1 Digital Computer, A1.

Assembly A1 is an industrial grade general-purpose computer based on the Windows XP Pro operating system. Associated equipment includes a keyboard, a mouse, a PCI audio card and a GPS clock distribution card (-2 only). Also included are hard disk and DVD-RW drives for program and file storage. The computer controls and monitors all Importer functions. Various screens, each controlling and monitoring different aspects of the system, as described in Section 3, are displayed on a customer-provided monitor.

4-2.2 PCI Audio CCA, A2.

The PCI Audio CCA provides one balanced mono/stereo analog input and output, and either two mono/stereo AES or S/PDIF digital inputs and outputs (-1) or one mono/stereo AES or S/PDIF digital input and output (-2). Digital signal processor (DSP) circuitry controls all on-board audio processing. All analog and digital inputs are mixed and routed to the motherboard as a 24-bit digital audio record stream via the PCI bus.

4-2.3 GPS Clock Distribution CCA, A3.

The GPS CCA provides GPS-synchronized 44.1kHz fixed-rate sample conversion for up to two independent AES digital sources. The -2 version uses only one digital input. The sampled outputs are routed to the PCI Audio CCA.

4-3. DETAILED CIRCUIT DESCRIPTIONS

This section provides detailed circuit description for the non-purchased assemblies. Simplified schematics are provided where appropriate. A complete set of schematic diagrams may be found in Section 7.

4-3.1 GPS Clock Distribution CCA, A3.

Refer to Figure 4-3 GPS Clock Distribution CCA, A3, Simplified Block Diagram and Schematic 202224.

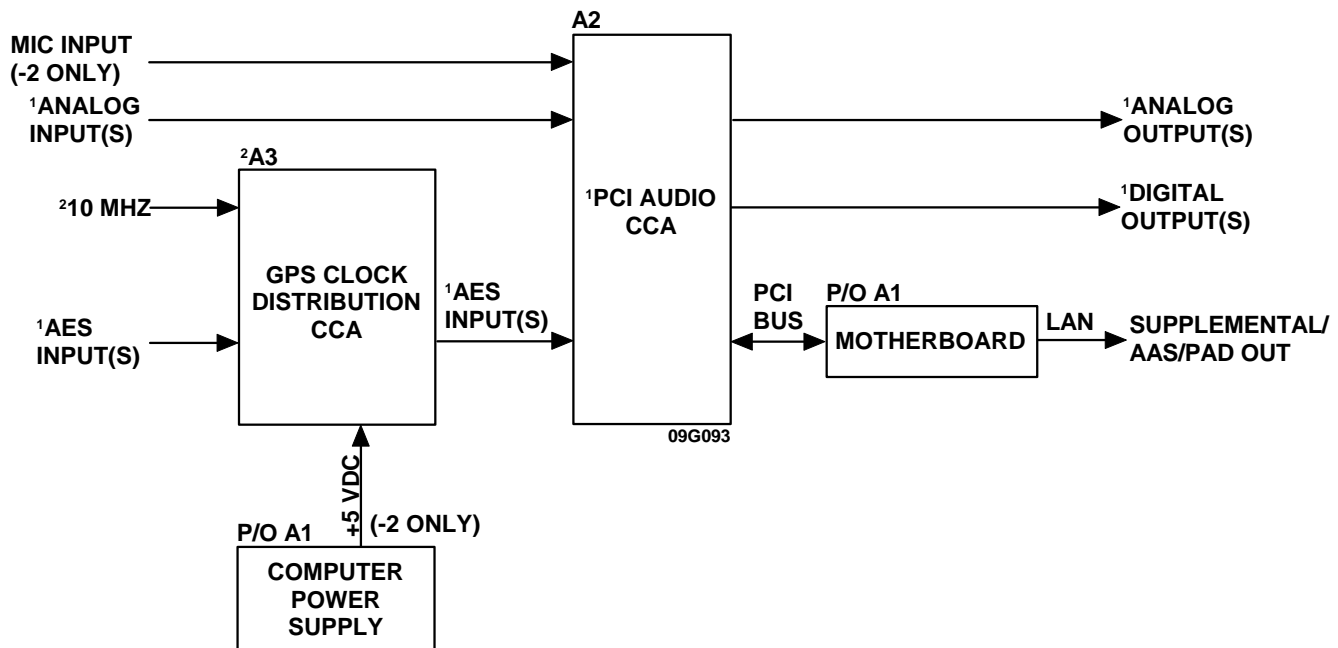
GPS/Clock Circuit

The GPS/clock circuit consists of clock drivers U1 and U13, RF power dividers Z1 and Z2, field-programmable clock synthesizers U2 and U7, bus transceiver U8, binary counter U11 and associated components.

A 1PPS signal from connector J5 is clock driven by U1 to connectors J14, J17 and J20. The 1PPS outputs are not currently used.

A +13 dbm, 10 MHz GPS clock signal from connector J6 is applied to the clock circuit. Power divider Z1 routes a +9.5 dBm clock to Z2 and through a 17.5 dB pad, which appears as a -8 dBm clock at connector J19. Power divider Z2 routes a +6 dBm clock to connectors J16 and J21, and to the reset circuit. The 10 MHz outputs at J16, J19 and J21 are not currently used.

Clock synthesizers U2 and U7 convert the 10 MHz input to 352.8 kHz and 11.2896 MHz clock signals. The 352.8 kHz is divided by 8 by binary counter U11, which outputs a 44.1 kHz clock signal that is clock driven by U13 to connector J22. The 44.1 kHz clock signal at J22 is not currently used. The 11.2896 MHz clock signal is routed to the sample rate conversion circuit.



- ¹ - THE AVAILABLE AUDIO CARDS OFFER DIFFERENT FEATURES. THE NUMBER OF ANALOG, DIGITAL AND OTHER INPUTS AND OUTPUTS IS DEPENDENT ON WHICH AUDIO CARD IS USED.
- ² - THE EXTERNAL 10 MHZ REFERENCE AND GPS CLOCK CCA A3 ARE REQUIRED ONLY FOR THE -2 VERSION USING THE ASI5111 AUDIO CARD. THE ORBAN 1101 AUDIO CARD (-1 VERSION) MAY USE AN EXTERNAL OR AN ON-BOARD 10 MHZ SOURCE.

Figure 4-1. Importer Simplified Block Diagram.

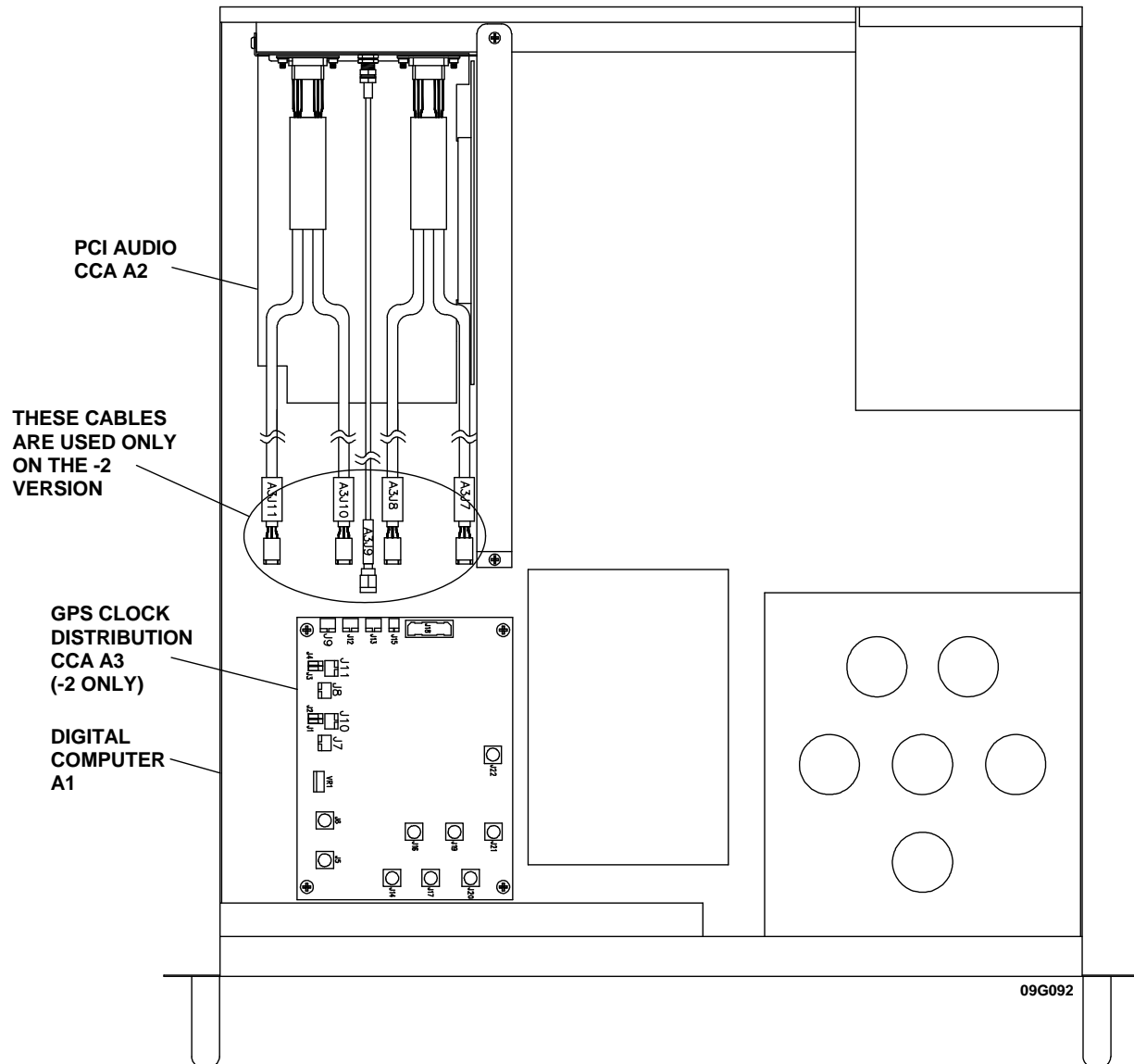


Figure 4-2. Assembly Locator Diagram.

Sample Rate Conversion Circuit

The sample rate conversion circuit consists of digital audio sample rate converters U5 and U6, transformers T1-T4, relay K1, jumpers J1-J4 and associated components.

Digital audio from J7 is routed through jumpers J1 and J2, and transformer coupled by T1 to sample rate converter U5. The jumpers allow the digital input to be applied to or bypass sample rate converter U5. They are factory set to apply the audio to U5.

This digital serial stream can be 16, 20, or 24 bits per sample. The sample rate can be from 8 kHz to 108 kHz. If the input sample rate is below 44.1 ksp/s, then the full input bandwidth of 20 kHz cannot be preserved. Rate converter U5 accepts an 11.2896 MHz system clock that is divided by 256 to produce 44.1 ksp/s. Converter U5 performs the sample rate conversion to produce a 24-bit serial output stream. This output stream is transformer coupled by T2 through J10 to PCI audio card A2.

The other digital input from J8, and through jumpers J3 and J4, is handled by sample rate converter U6 in a similar fashion. The output from U6 is transformer coupled by T4 to PCI audio card A2 and to the delayed/real-time audio switching circuit. The -2 version does not use the U6 sample rate converter circuit.

Delayed/Real-Time Audio Switching Circuit

The audio switching circuit consists of relay K1, connectors J9, J12, J123 and J15, and external manual and automatic switching components.

Real-time audio from transformer T4 and delayed audio from J12 are applied to relay K1. Manual switching input from J13 or automatic switching input from J15 (via J13) control K1. When de-energized, real-time audio is output at J9. When energized, delayed audio is output at J9. The -2 version does not use the delayed/real-time audio switching circuit.

Reset Circuit

The reset circuit consists of logarithmic amplifier U12, supervisory circuits U3 and U9, bus transceiver U4, comparator U10, transistors Q1-Q3 and Q6, LED DS3 and associated components.

With a 10 MHz GPS clock input at J6, log amp U12 provides a decibel-equivalent voltage output of 2.6V to comparator U10, pin 5. Compared to a +1.47 reference voltage at U10, pin 4, the output at pin 2 is pulled up by R23, allowing +3.3V to be applied to pin 5 of supervisory circuit U9. This keeps the output at U9, pin 1 high.

This high is applied through bus transceiver U4 to transistor Q6, causes it to conduct. This lights LED DS3 indicating the presence of the 10 MHz GPS clock input. An external LED may be connected to connector J25 to monitor the presence of the 10 MHz signal.

The high at U9, pin 1 also causes transistor Q3 to conduct. This, in turn, causes transistors Q1 and Q2 to conduct. This applies a high to pins 2 and 7 of U2 and U7, enabling the clock synthesizers.

A missing 10 MHz input at J6 causes the U12, pin 4 output to drop below the 1.47V reference at U10, pin 4. This causes the RESET* output at U9, pin 1 to go active (low). As a result, Q6 stops conducting and LED DS3 turns off, indicating the loss of the 10 MHz input.

This low is also applied as a manual reset to supervisory circuit U3, pin 3. Its RESET* output at pin 1 is routed to and resets sample rate converters U5 and U6.

In addition, the low at U9, pin 1 also causes transistor Q3 to stop conducting. As a result, transistors Q2 and Q3 stop conducting, and pins 2 and 7 of clock synthesizers U2 and U7 are taken low. This causes U2 and U7 to shut down.

Power Circuit

The power circuit consists of voltage regulator VR1, LEDs DS1 and DS2, and associated components.

Five volts DC input power from the computer power supply (P/O A1) is routed from connector J18 to on-board circuits, voltage regulator VR1 and lights LED DS1. Regulator VR1 converts the +5V to +3.3V and routes it to on-board circuits. The +3.3V also lights LED DS2.

SECTION 5 - MAINTENANCE

5-1. ROUTINE MAINTENANCE

The following information describes maintenance and troubleshooting for the 800I HD Importer. Logical and methodical troubleshooting procedures should be used, proceeding from front panel indicators to circuit checks and measurements. Refer to Section 3 for the location of adjustable or selectable components of the Importer.

WARNING
HIGH VOLTAGE HAZARD

**ENSURE AC POWER IS REMOVED
FROM THE IMPORTER BEFORE
SERVICING. FAILURE TO COMPLY
MAY RESULT IN DEATH OR INJURY
TO PERSONNEL.**

5-2. MAINTENANCE CONCEPT

Most maintenance and repair of the Importer may be performed with the assemblies remaining in place. Certain assemblies and subassemblies should be removed and returned to the manufacturer for repair or repaired on the bench. Removal and replacement procedures are included in this section for those assemblies, subassemblies, and components where special attention is required. Proper safety procedures should be used while maintenance is being performed.

WARNING

**AVOID CONTACT WITH HIGH
VOLTAGES PRESENT IN THIS
EQUIPMENT. FAILURE TO COMPLY
MAY CAUSE INJURY OR DEATH.**

5-3. ELECTROSTATIC HANDLING

CAUTION

**FAILURE OF PERSONNEL TO FOLLOW
THESE INSTRUCTIONS MAY RESULT
IN DAMAGE TO MOS TYPE DEVICES.**

This paragraph is intended to increase awareness in all personnel who handle static sensitive devices. Component destruction is bothersome and costly but is usually caught before the circuit board or device leaves the factory (vendor). Problems that are expensive and hard to find result from devices that are only slightly altered or degraded after exposure to static electricity. They might function within specifications during the final quality assurance check, but their life can be severely shortened.

The problems associated with static charges in the electronics environment can be controlled. To accomplish this, programs must be instigated throughout the user's facility to increase the level of awareness in all personnel who handle static sensitive devices.

Once educated, personnel must be provided with the proper equipment to implement these techniques of static control. At the work bench this includes conductive table mats, conductive wrist straps, conductive floor mats and ionized air. When parts are removed from the work station, conductive packages or carriers are required to extent the level of protection.

5-3.1 General.

The Importer includes many CMOS solid-state devices. Being MOS devices, damage can be encountered by electrostatic discharge (ESD) due to improper handling or installation. Once breakdown begins, there is enough energy stored in the gate-source capacitance to cause complete perforation of the gate oxide. With a gate-to-source rating of $V_{GS} = \pm 20$ volts maximum and electrostatic voltages typically being 100-25,000 volts, it becomes very clear that these devices require special handling.

5-3.2 Implementation.

The basic method for protecting devices combines the prevention of static buildup with the removal of existing charges. The mechanism of charge removal from charged objects differs between insulators and conductors. Since charge cannot flow through an insulator, it cannot be removed by contact with a conductor. If the item to be discharged is an insulator (plastic box, personal clothing, etc.), ionized air is required. If the object is a conductor (metal tray, conductive bag, personal body, etc.), complete discharge can be accomplished by grounding.

A static safe work station should include a grounded conductive tabletop or mat, floor mats, grounded personnel (wrist straps), conductive containers, and ionized air to remove static charge from nonconductors. All soldering irons should be the grounded type. All nonconductors such as styrofoam cups, cellophane, paper, plastic bags, etc. should be removed from the work area. Above all, education of all personnel in the proper handling of static sensitive devices is the key to preventing ESD failures.

The following general guidelines are applicable to the handling of static sensitive devices.

1. Operations which require human handling should be minimized.
2. Personnel maintaining electrostatic discharge sensitivity equipment, where ground straps cannot be used, should ground themselves prior to removing sensitive items from protective packaging.
3. Tools and test equipment used in protected areas should be properly grounded if possible. Hand tools should not utilize insulation on the handles. If plastic handled tools must be used, they should be treated with a topical antistat.
4. Assure that all containers, tools, test equipment, and fixtures are grounded before and during use either directly or by contact with a grounded surface. Grounding of electrical equipment should be via a grounded plug, not through the conductive surface of the grounded work station.
5. Work instructions, test procedures, drawings and similar documents used in a protected area should not be covered in common plastic sheeting or containers.

6. Worker clothing should never make contact with the devices, and workers should avoid friction producing activities in the vicinity of the work station, including putting on and taking off of smocks, wiping feet, rubbing of hands, etc.
7. Workers should avoid touching device leads or contacts and should handle parts only by the case.
8. When devices are removed from their protection, they should be kept either:
 - a. Pin down on a conductive surface; or
 - b. In a conductive container with the pins in contact with the surface.
9. Periodic continuity and resistivity measurements should be performed. The tests should include:
 - a. Worker ground straps
 - b. Work surfaces
 - c. Floor mats
 - d. Other ground connections
10. Caution should be observed in using solvents such as acetone and alcohol or other cleaning agents for cleaning ESD protective materials. The use of such solvents can reduce the effectiveness of some protective materials, especially those employing detergent type antistats.

5-3.3 Grounding.

Although grounding has thus far been only casually mentioned in conjunction with ESD protection, it is essential. Earth ground rods for ESD protection should be solid copper or copper jacketed steel and should be driven six to eight feet into the earth beyond the building slab with approximately six inches exposed for making connection. Dry soil conditions may require a copper sulfate drip. Electrical grounds should be isolated from static grounds. Water pipes offer convenient grounds; however, they may not be connected to ground.

These grounding methods may seem excessive. However, these techniques are for minimizing the difference of potential between separate grounds, and not for reducing the ohmic resistance to earth.

5-3.4 Summary.

Transistors and integrated circuits within the Importer and control systems are sensitive to electrostatic damage. It is the purpose of this section to broaden the user's awareness and understanding of the potential danger of failure by ESD. Continental does not propose to define a program to control the buildup of static charge but to mention that a static control program is essential to the reliability of the Exporter.

5-4. CLEANING

Clean the Importer when dust accumulation occurs anywhere inside or outside the Importer. A solvent of trichlorethylene may be used as a cleaning material.

1. Remove dust from chassis, assemblies, and components with a soft-bristled brush.
2. Remove foreign matter from flat surfaces and accessible areas with a lintless cloth moistened with solvent. Dry with a clean, dry, lintless cloth.
3. Wash less accessible areas with solvent lightly applied with a small soft-bristled brush.
4. Remove and clean the air intake filter mounted behind the left side of the front panel. Open access door. To the left of ALARM RESET button, push in hook and slide to the right until filter is removed.

5-5. INSPECTION

Inspect the Importer at least once monthly. Check for dust accumulation. Check all metal parts for corrosion and general deterioration. Examine wiring and components for signs of overheating. Ensure that all controls are operating smoothly. Inspect all connections and tighten any loose nuts, screws, or bolts.

5-6. TROUBLESHOOTING

If the Importer fails to operate properly, check the front panel LEDs and, if necessary, the internal assembly LEDs for an indication of the problem. Descriptions of the front and rear panel LEDs are provided in Table 3-1. Internal assembly LED indications are provided in Tables 5-1. Use the overall schematic, 200397, and assembly schematics in Section 7 when needed.

Table 5-1. Internal Assembly LED Indicators.

LED	Indication
<u>GPS Clock Distribution CCA, A3 (-2 only)</u>	
DS1 (green)	+5V detected
DS2 (green)	+3.3V detected
DS3 (green)	10 MHz detected
<u>Motherboard CCA, P/O A1</u>	
Power LED (green)	System is on, in sleep mode or in soft-off mode

5-7. REPLACEMENT PROCEDURES

The following information is used when replacing faulty assemblies inside the Importer chassis. The prerequisite for all replacement procedures is to remove Importer input power and the top chassis cover. Disconnect cables, as necessary, to gain access to assembly being replaced. Cut cable ties, as necessary, to separate cabling/wiring. Replacement procedures are the reverse of the removal procedures. On the new assembly, ensure any jumpers and DIP switch settings match those on the assembly being replaced.

When appropriate, use ESD procedures as discussed in Paragraph 5-3. Unless otherwise noted, refer to Assembly Drawing 200396.

WARNING **HIGH VOLTAGE HAZARD**

**ENSURE AC POWER IS REMOVED
FROM THE IMPORTER BEFORE
SERVICING. FAILURE TO COMPLY
MAY RESULT IN DEATH OR INJURY TO
PERSONNEL.**

5-7.1 Replace Digital Computer A1 Components.

Refer to the chassis and motherboard user manuals in Section 8, Supplemental Data for maintenance procedures.

5-7.2 Replace PCI Audio CCA, A2.

1. Disconnect all cables from card.
2. Remove screw securing card to mounting bracket.
3. Remove card from motherboard.

5-7.3 Replace GPS Clock Distribution CCA, A3.

1. Disconnect all cables from card.
2. Remove four screws securing card to the standoffs and remove card.

5-8. ADJUSTMENTS

All Importers are factory adjusted and pretuned to specific user requirements. No adjustments are required by the user.

SECTION 6 - PARTS LISTS

6-1. INTRODUCTION

This section contains a list of repairable/replaceable electrical and selected mechanical parts for the Type 800I HD Importer.

6-2. INDEX OF PARTS LISTS

Table 6-1 is an index of parts lists listed in reference designator order. Table 6-2 list the parts lists in ascending numerical order. The parts lists are arranged in ascending numerical order. Paragraphs 6-3 through 6-7 describe the five columns in the parts lists.

6-3. REFERENCE DESIGNATIONS (REF DES)

This column contains the reference designators of parts that have been assigned on schematics or wiring diagrams, and/or index numbers for parts which have not been assigned reference designators. When a reference designator within a series of designators has not been assigned a part number, the unassigned reference designator will be omitted from the list.

6-4. QUANTITY

This column contains the quantity of each component or assembly used in the major subassembly.

6-5. CAGE CODE

The Commercial and Government Entity (CAGE) code is a five-character alphanumeric code assigned to the manufacturer of the assembly or component.

6-6. PART NUMBER

Continental Electronics specification or drawing control numbers for each item in the parts lists are listed in this column. An asterisk preceding a part number indicates a separate parts list exists for that item. Separate parts lists have been included for all maintenance significant items.

6-7. DESCRIPTION

The identifying noun or item name followed by a brief description such as size, color, rating or special characteristics will be listed in this column. The description for electrical/electronic parts includes the application ratings and tolerances.

6-8. ILLUSTRATIONS

Parts listed in the REF DES column are located on assembly drawings. The assembly drawings are located at the end of this section after the last parts list. The Assembly drawings are arranged in ascending numerical order following the top-level drawing, 200396. When a replaceable item is hidden from view, a dotted leader line is used to show the item's location.

Table 6-1. Index of Parts Lists in Ref. Des. Order.

Ref. Des.	Description/Title	Part No.	Rev.
—	HD Importer, 800I	200396 -1	4
—	HD Importer, 800I	200396 -2	1
A3	CCA, GPS Clock Distribution	202223-1	D

Table 6-2. Index of Parts Lists in Numerical Order.

Part No.	Description/Title	Ref. Des.
200396-1	HD Importer, 800I	—
200396-2	HD Importer, 800I	—
202223-1	CCA, GPS Clock Distribution	A3

200396-1 800I HD IMPORTER Rev. 4				
Ref. Des.	Qty	Cage	Part No.	Description
1	0.00	52151	200396	800I HD IMPORTER ASSEMBLY,
2	0.00	52151	200397	SCHEMATIC DIAGRA,IMPORTER
3	1.00	52151	* 202277-3	KIT,SHIPPING,800I HD IMPORTER,EXPORTER,ORBAN PCI111
4	1.00	52151	202272-4	OVERLAY,FRONT PANEL, IMPORTER
5	1.00	52151	200348-1	LABEL,IBIQUITY IP NOTICE
A1	1.00	52151	109-0695-310	COMPUTER,DIGITAL,250G HARD DR,3.4GHZ P4,WINDOWS XP PRO,ATX MB, 1GB RAM,2U RACK MT CHASSIS
A2	1.00	52151	270-3359-020	SOUND CARD,PCI,2 AES I/O, 1 ANALOG I/O,2 WAVEI/O, AUDIO PROCESSOR

200396-2 800I HD IMPORTER Rev. 1				
Ref. Des.	Qty	Cage	Part No.	Description
1	0.00	52151	200396	800I HD IMPORTER ASSEMBLY,
2	0.00	52151	200397	SCHEMATIC DIAGRA,IMPORTER
3	0.00	52151	WL200396-2	INTRA-UNIT WIRINGLIST,IMPORTER
4	1.00	52151	202272-4	OVERLAY,FRONT PANEL, IMPORTER
5	1.00	52151	200348-1	LABEL,IBIQUITY IP NOTICE
6	1.00	52151	200398-1	PLATE,ADAPTER
7	4.00	52151	191-0017-110	POST,ELECTRICAL-MECHANICAL EQUIPMENT:FEMALE,1/4 HEX,6-32 UNC X 3/4,ALUMINUM,GOLD IRIDITE
8	1.00	52151	* 202277-4	KIT,SHIPPING,800I HD IMPORTER,ASI5111,CEC SRC
9	8.00	52151	330-7040-100	SCREW,MACHINE,SEMS, 6-32 X 1/4 PPH,SQUARE CONE WASHER STEEL ZINC
10	1.00	52151	191-0064-010	STANDOFF,4-40X1/4 MALE/FEMALE
11	2.00	52151	330-7040-020	SCREW,MACHINE,SEMS, 4-40 X 1/4 PPH,SQUARE CONE WASHER, STEEL ZINC
12	1.00	52151	200405-1	BRACKET,PCI,TWO DB9 & ONE SMA CUTOUT BRACKET
A1	1.00	52151	109-0695-310	COMPUTER,DIGITAL,250G HARD DR,3.4GHZ P4,WINDOWS XP PRO,ATX MB, 1GB RAM,2U RACK MT CHASSIS
A2	1.00	52151	270-3359-040	AUDIO ADAPTER,LINEAR PCI
A3	1.00	52151	* 202223-1	CCA,GPS CLOCK DISTRIBUTION
W1	1.00	52151	* 200399-1	CABLE ASSEMBLY,AUDIO INPUT TO SRC,W1
W2	1.00	52151	* 200400-1	CABLE ASSEMBLY,AUDIO INPUT FROM SRC,W2
W3	1.00	52151	* 200401-1	CABLE ASSEMBLY,10MHZ INPUT,W3
W4	1.00	52151	* 200402-1	CABLE ASSEMBLY,CUSTOMER AUDIO INPUT,W4
W5	1.00	52151	* 200403-1	CABLE ASSEMBLY,AUDIO LINK SRC TO AUDIO CARD,W5

202223-1 GPS CLOCK DISTRIBUTION CCA Rev. D				
Ref. Des.	Qty	Cage	Part No.	Description
1	0.00	52151	202223	CCA,GPS CLOCK DISTRIBUTION
2	1.00	52151	202222-1	PRINTED WIRING BOARD, GPS CLOCK DISTRIBUTION
3	0.00	52151	202224	SCHEMATIC DIAGRAM, GPS CLOCK DISTRIBUTION
4	0.00	52151	651-9087	TEST SPEC: FOR 202223-1/2 GPS CLOCK DISTRIBUTION CCA
5	0.00	52151	202222	PRINTED WIRING BOARD GPS CLOCK DISTRIBUTION
C1	1.00	52151	913-7143-595	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIPTYPE, SURF MT, EIA SZ 0805
C2	1.00	52151	913-7143-595	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIPTYPE, SURF MT, EIA SZ 0805
C3	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +/- 10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C4	1.00	52151	184-9624-040	CAPACITOR, FIXED, ELECTROLYTIC: 10UF, 25VDC CHIP TYPE, SURFACE MT
C5	1.00	52151	184-9624-040	CAPACITOR, FIXED, ELECTROLYTIC: 10UF, 25VDC CHIP TYPE, SURFACE MT
C6	1.00	52151	913-7106-060	CAPACITOR, FIXED, CERAMIC: 100000PF, +/- 10%, 50 WVDC CHIP
C7	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +/- 10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C8	1.00	52151	913-7143-770	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 1206
C9	1.00	52151	913-7143-770	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 1206
C10	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +/- 10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C11	1.00	52151	913-7143-595	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIPTYPE, SURF MT, EIA SZ 0805
C12	1.00	52151	913-7143-595	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIPTYPE, SURF MT, EIA SZ 0805
C13	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +/- 10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C14	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +/- 10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C15	1.00	52151	913-7143-770	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 1206
C16	1.00	52151	913-7143-380	CAPACITOR, FIXED, CERAMIC: 1000PF, +/- 10%, 50WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 0805
C17	1.00	52151	913-7143-770	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 1206
C18	1.00	52151	913-7143-380	CAPACITOR, FIXED, CERAMIC: 1000PF, +/- 10%, 50WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 0805
C19	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +/- 10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C20	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +/- 10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C21	1.00	52151	913-7143-770	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 1206
C22	1.00	52151	913-7143-770	CAPACITOR, FIXED, CERAMIC: 0.1UF, +/- 10%, 50WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 1206
C23	1.00	52151	913-7143-820	CAPACITOR, FIXED, CERAMIC, .33UF +/- 10%, 25V, SMT 0805
C24	1.00	52151	913-7143-460	CAPACITOR, FIXED, CERAMIC: 4700PF, +/- 10%, 50WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 0805
C25	1.00	52151	913-7143-820	CAPACITOR, FIXED, CERAMIC, .33UF +/- 10%, 25V, SMT 0805

202223-1 GPS CLOCK DISTRIBUTION CCA Rev. D				
Ref. Des.	Qty	Cage	Part No.	Description
C26	1.00	52151	913-7143-460	CAPACITOR, FIXED, CERAMIC: 4700PF, +-10%, 50 WVDC, CHIP TYPE, SURF MT, X7R TEMP CHAR, WRPRND TERM, EIA SZ 0805
C27	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +-10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C28	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +-10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C29	1.00	52151	184-9624-040	CAPACITOR, FIXED, ELECTROLYTIC: 10UF, 25VDC CHIP TYPE, SURFACE MT
C30	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +-10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C31	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +-10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C32	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +-10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C33	1.00	52151	913-7143-650	CAPACITOR, FIXED, CERAMIC: 0.01UF, +-10%, 50 WVDC, CHIP TYPE, X7R TEMP CHAR, WRPRND TERM, SURF MT, EIA SZ 1206
C34	0.00	52151	NOT-USED	NOT-USED
C35	1.00	52151	184-9616-170	CAPACITOR, FIXED, ELECTROLYTIC 10UF, 10%, 10V, TANTALUM, CHIP TYPE, SMT
C36	0.00	52151	NOT-USED	NOT-USED
C37	0.00	52151	NOT-USED	NOT-USED
D1	1.00	52151	353-5354-010	SEMICONDUCTOR DEVICE, DIODE: SILICON, HOT CARRIER, 30VPRV, SCHOTTKY BARRIER TYPE, SURFACE MT, 3 PIN SOT PKG
DS1	1.00	52151	262-5037-060	LIGHT, INDICATOR: GREEN LED, 30MA, 75MW, 2.1 VOLTS
DS2	1.00	52151	262-5037-060	LIGHT, INDICATOR: GREEN LED, 30MA, 75MW, 2.1 VOLTS
DS3	1.00	52151	262-5037-060	LIGHT, INDICATOR: GREEN LED, 30MA, 75MW, 2.1 VOLTS
J1	1.00	52151	372-9604-250	CONNECTOR; PIN HEADER, 3 PIN, ELECTRICAL, PC MOUNTS NGL ROW, 0.100" CENTERS, 0.025" SQ PIN, GOLD FINISH
J2	1.00	52151	372-9604-250	CONNECTOR; PIN HEADER, 3 PIN, ELECTRICAL, PC MOUNTS NGL ROW, 0.100" CENTERS, 0.025" SQ PIN, GOLD FINISH
J3	1.00	52151	372-9604-250	CONNECTOR; PIN HEADER, 3 PIN, ELECTRICAL, PC MOUNTS NGL ROW, 0.100" CENTERS, 0.025" SQ PIN, GOLD FINISH
J4	1.00	52151	372-9604-250	CONNECTOR; PIN HEADER, 3 PIN, ELECTRICAL, PC MOUNTS NGL ROW, 0.100" CENTERS, 0.025" SQ PIN, GOLD FINISH
J5	1.00	52151	372-9677-030	CONN, RECT, SMA PCB MOUNT JACK
J6	1.00	52151	372-9677-030	CONN, RECT, SMA PCB MOUNT JACK
J7	1.00	52151	372-9641-020	CONNECTOR, RECEPTACLE, ELECTRICAL: 3 CIRCUITS 2.5 AMPERES
J8	1.00	52151	372-9641-020	CONNECTOR, RECEPTACLE, ELECTRICAL: 3 CIRCUITS 2.5 AMPERES
J9	1.00	52151	372-9641-020	CONNECTOR, RECEPTACLE, ELECTRICAL: 3 CIRCUITS 2.5 AMPERES
J10	1.00	52151	372-9641-020	CONNECTOR, RECEPTACLE, ELECTRICAL: 3 CIRCUITS 2.5 AMPERES
J11	1.00	52151	372-9641-020	CONNECTOR, RECEPTACLE, ELECTRICAL: 3 CIRCUITS 2.5 AMPERES
J12	1.00	52151	372-9641-020	CONNECTOR, RECEPTACLE, ELECTRICAL: 3 CIRCUITS 2.5 AMPERES

202223-1 GPS CLOCK DISTRIBUTION CCA Rev. D				
Ref. Des.	Qty	Cage	Part No.	Description
J13	1.00	52151	372-9641-020	CONNECTOR,RECEPTACLE, ELECTRICAL:3 CIRCUITS 2.5 AMPERES
J14	1.00	52151	372-9677-030	CONN,RECT,SMA PCB MOUNT JACK
J15	1.00	52151	372-9641-010	CONNECTOR,RECEPTACLE, ELECTRICAL:2 CIRCUITS 2.5 AMPERES
J16	1.00	52151	372-9677-030	CONN,RECT,SMA PCB MOUNT JACK
J17	1.00	52151	372-9677-030	CONN,RECT,SMA PCB MOUNT JACK
J18	1.00	52151	363-2004-020	CONNECTOR,BODY,PLUG,ELECTRICAL:4 PIN DISK DRIVEPOWER,PWB MOUNT, STRAIGHT,NYLON
J19	1.00	52151	372-9677-030	CONN,RECT,SMA PCB MOUNT JACK
J20	1.00	52151	372-9677-030	CONN,RECT,SMA PCB MOUNT JACK
J21	0.00	52151	NOT-USED	NOT-USED
J22	1.00	52151	372-9677-030	CONN,RECT,SMA PCB MOUNT JACK
J23	1.00	52151	372-9604-250	CONNECTOR;PIN HEADER,3 PIN, ELECTRICAL,PC MOUNTSINGL ROW, 0.100"CENTERS,0.025"SQ PIN,GOLD FINISH
J24	1.00	52151	372-9604-250	CONNECTOR;PIN HEADER,3 PIN, ELECTRICAL,PC MOUNTSINGL ROW, 0.100"CENTERS,0.025"SQ PIN,GOLD FINISH
J25	1.00	52151	372-9641-020	CONNECTOR,RECEPTACLE, ELECTRICAL:3 CIRCUITS 2.5 AMPERES
K1	1.00	52151	410-0572-030	RELAY,REED:DPDT,0.25AMP,540MW 100VDC CONTACT RATING,5VDC,46 OHM COIL PC MOUNT,DUAL-IN-LINE PKG
L1	1.00	52151	288-4062-010	BEAD,FERRITE,200MA,0.5 OHM@DC 600 OHM @ 100 MHZ,0603,SMT PKG
L2	1.00	52151	288-4062-010	BEAD,FERRITE,200MA,0.5 OHM@DC 600 OHM @ 100 MHZ,0603,SMT PKG
P1	1.00	52151	372-9604-150	CONNECTOR,JUMPER:2-CIRCUIT
P2	1.00	52151	372-9604-150	CONNECTOR,JUMPER:2-CIRCUIT
P3	1.00	52151	372-9604-150	CONNECTOR,JUMPER:2-CIRCUIT
P4	1.00	52151	372-9604-150	CONNECTOR,JUMPER:2-CIRCUIT
P5	1.00	52151	306-3056-020	HEADER,SHORTING,2-PIN JUMPER 0.100 IN CTRS,BLACKPLASTIC INSULATOR 10 U IN GOLD PLTD CONTACTS,0.240 IN TALL
P6	1.00	52151	306-3056-020	HEADER,SHORTING,2-PIN JUMPER 0.100 IN CTRS,BLACKPLASTIC INSULATOR 10 U IN GOLD PLTD CONTACTS,0.240 IN TALL
Q1	1.00	52151	352-5104-030	TRANSISTOR:SILICON,PNP, 200MADC,40V C-E,350MW,250MHZ PLASTIC SOT-23 SURFACE MT PKG
Q2	1.00	52151	352-5104-030	TRANSISTOR:SILICON,PNP, 200MADC,40V C-E,350MW,250MHZ PLASTIC SOT-23 SURFACE MT PKG
Q3	1.00	52151	352-5204-010	TRANSISTOR:TMOS,FET,DRAIN-SOURCE=60VDC,280MADC,SOT-23 SURFACE MT PKG
Q6	1.00	52151	352-5162-040	TRANSISTOR:NPN,SILICON,VCE=40V,IC=200MADC,PD=625M WMAX,FT=300MHZ MIN,SOT-23,PLASTIC SURFACE MT PKG
R1	0.00	52151	NOT-USED	NOT-USED
R2	1.00	52151	724-5057-000	RESISTOR,FIXED,FILM:0 OHM, +-1%,1/4 WATT @70 DEG C 1/32W @ 125C, THICK FILM CHIP TYPE,TC=100PPM/DEG C
R3	1.00	52151	724-5057-000	RESISTOR,FIXED,FILM:0 OHM, +-1%,1/4 WATT @70 DEG C 1/32W @ 125C, THICK FILM CHIP TYPE,TC=100PPM/DEG C
R4	1.00	52151	724-5057-050	RESISTOR,FIXED,FILM:110 OHM, +-1%,1/4 WATT @ 70C1/32W @ 125C, THICK FILM CHIP TYPE,TC=100PPM/DEG C

202223-1 GPS CLOCK DISTRIBUTION CCA Rev. D				
Ref. Des.	Qty	Cage	Part No.	Description
R5	1.00	52151	724-5057-050	RESISTOR, FIXED, FILM: 110 OHM, +/-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R6	1.00	52151	724-5057-155	RESISTOR, FIXED, FILM: 1000 OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R7	1.00	52151	724-5057-155	RESISTOR, FIXED, FILM: 1000 OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R8	1.00	52151	724-5057-155	RESISTOR, FIXED, FILM: 1000 OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R9	1.00	52151	724-5057-155	RESISTOR, FIXED, FILM: 1000 OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R10	1.00	52151	724-5057-365	RESISTOR, FIXED, FILM: 47.5K OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R11	1.00	52151	724-5057-050	RESISTOR, FIXED, FILM: 110 OHM, +/-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R12	1.00	52151	724-5057-365	RESISTOR, FIXED, FILM: 47.5K OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R13	1.00	52151	724-5057-050	RESISTOR, FIXED, FILM: 110 OHM, +/-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R14	1.00	52151	724-5057-680	RESISTOR, FIXED, FILM: 40.2 OHM, +/-1%, 1/4 WATT @ 70 C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R15	1.00	52151	724-5077-328	RESISTOR, FIXED, FILM: 499 OHM, +/-0.1%, 0.25WATT @ 70C THICK FILM CHIP TYPE, TC=25PPM
R16	1.00	52151	724-5077-290	RESISTOR, FIXED, FILM: 316 OHM, +/-0.1%, .25W @ 70C THICK FILM CHIP TYPE, TC=25PPM
R17	1.00	52151	724-5057-680	RESISTOR, FIXED, FILM: 40.2 OHM, +/-1%, 1/4 WATT @ 70 C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R18	1.00	52151	724-5057-002	RESISTOR, FIXED, FILM: 12.1 OHM, +/-1%, 1/4 WATT @ 70C DEG C
R19	1.00	52151	724-5030-120	RESISTOR, FIXED, 1/8W, 5%, 1.6K OHM, SMT 0805 PKG
R20	1.00	52151	724-5057-365	RESISTOR, FIXED, FILM: 47.5K OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R21	1.00	52151	724-5030-120	RESISTOR, FIXED, 1/8W, 5%, 1.6K OHM, SMT 0805 PKG
R22	1.00	52151	724-5057-365	RESISTOR, FIXED, FILM: 47.5K OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R23	1.00	52151	724-5057-155	RESISTOR, FIXED, FILM: 1000 OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R24	1.00	52151	724-5057-286	RESISTOR, FIXED, FILM: 12.4K OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R25	1.00	52151	724-5057-365	RESISTOR, FIXED, FILM: 47.5K OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R26	1.00	52151	724-5057-365	RESISTOR, FIXED, FILM: 47.5K OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R27	1.00	52151	724-5057-275	RESISTOR, FIXED, FILM: 10K OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R28	1.00	52151	724-5057-565	RESISTOR, FIXED, FILM: 49.9 OHM, +/-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R29	1.00	52151	724-5057-010	RESISTOR, FIXED, FILM: 51.1 OHM, +/-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R30	1.00	52151	724-5057-010	RESISTOR, FIXED, FILM: 51.1 OHM, +/-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R31	1.00	52151	724-5057-010	RESISTOR, FIXED, FILM: 51.1 OHM, +/-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C

202223-1 GPS CLOCK DISTRIBUTION CCA Rev. D				
Ref. Des.	Qty	Cage	Part No.	Description
R32	1.00	52151	724-5057-010	RESISTOR, FIXED, FILM: 51.1 OHM, +-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R33	0.00	52151	NOT-USED	NOT-USED
R34	1.00	52151	724-5057-175	RESISTOR, FIXED, FILM: 1500 OHM, +-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R35	1.00	52151	724-5057-175	RESISTOR, FIXED, FILM: 1500 OHM, +-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R36	1.00	52151	724-5057-175	RESISTOR, FIXED, FILM: 1500 OHM, +-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R37	1.00	52151	724-5057-175	RESISTOR, FIXED, FILM: 1500 OHM, +-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R38	1.00	52151	724-5057-540	RESISTOR, FIXED, FILM: 1M OHM, +-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R39	1.00	52151	724-5057-185	RESISTOR, FIXED, FILM: 2000 OHM, +-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R40	1.00	52151	724-5057-185	RESISTOR, FIXED, FILM: 2000 OHM, +-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
R41	1.00	52151	724-5057-155	RESISTOR, FIXED, FILM: 1000 OHM, +-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R42	1.00	52151	724-5057-155	RESISTOR, FIXED, FILM: 1000 OHM, +-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R43	1.00	52151	724-5057-118	RESISTOR, FIXED, FILM: 470 OHM, +-1%, 1/4 WATT @ 70C THICK FILM CHIP TYPE, TC=100 PPM
R44	1.00	52151	724-5057-080	RESISTOR, FIXED, FILM: 221 OHM, +-1%, 1/4 WATT @ 70C 1/32W @ 125C, THICK FILM CHIP TYPE, TC=100PPM/DEG C
T1	1.00	52151	667-4020-010	TRANSFORMER, DIGITAL/AUDIO INTERFACE, 225MH, 1:1 TURNS RATIO, 8-PIN SMT
T2	1.00	52151	667-4020-010	TRANSFORMER, DIGITAL/AUDIO INTERFACE, 225MH, 1:1 TURNS RATIO, 8-PIN SMT
T3	1.00	52151	667-4020-010	TRANSFORMER, DIGITAL/AUDIO INTERFACE, 225MH, 1:1 TURNS RATIO, 8-PIN SMT
T4	1.00	52151	667-4020-010	TRANSFORMER, DIGITAL/AUDIO INTERFACE, 225MH, 1:1 TURNS RATIO, 8-PIN SMT
TP1	1.00	52151	372-9828-010	CONNECTOR, ELECTRICAL, TEST POINT: RED, PWB LOOP
TP2	1.00	52151	372-9828-010	CONNECTOR, ELECTRICAL, TEST POINT: RED, PWB LOOP
U1	1.00	52151	351-5050-030	MICROCIRCUIT, DIGITAL: CLOCK DRIVER, MINIMUM SKEW 1 INPUT TO 4 OUTPUTS, 300PS SKEW, 3V VCC, 8-PIN SOIC
U2	1.00	52151	* 202229-1	MICROCIRCUIT, DIGITAL: PROGRAMMED
U3	1.00	52151	351-5487-010	MICROCIRCUIT, DIGITAL: PROCESSOR SUPERVISORY CIRCUIT 5-PIN, SOP PKG, SURFACE MT
U4	1.00	52151	351-5079-060	MICROCIRCUIT, DIGITAL, 2-BIT DUAL-SUPPLY BUS TRANSCEIVER, 8-PIN SSOP SMT, 1.65V TO 5.5V SUPPLY RANGE
U5	1.00	52151	351-5398-100	MICROCIRCUIT, DIGITAL, CMOS DIGITAL AUDIO SAMPLE RATE CONVERTER SMT, 20-PIN, PLASTIC SOIC PKG
U6	1.00	52151	351-5398-100	MICROCIRCUIT, DIGITAL, CMOS DIGITAL AUDIO SAMPLE RATE CONVERTER SMT, 20-PIN, PLASTIC SOIC PKG
U7	1.00	52151	* 202229-2	MICROCIRCUIT, DIGITAL: PROGRAMMED
U8	1.00	52151	351-5079-060	MICROCIRCUIT, DIGITAL, 2-BIT DUAL-SUPPLY BUS TRANSCEIVER, 8-PIN SSOP SMT, 1.65V TO 5.5V SUPPLY RANGE
U9	1.00	52151	351-5487-045	MICROCIRCUIT, PROCESSOR SUPERVISORY, ACTIVE LOW RESET, 3.3V OPN 200MS TIME DELAY

202223-1 GPS CLOCK DISTRIBUTION CCA Rev. D				
Ref. Des.	Qty	Cage	Part No.	Description
U10	1.00	52151	351-1122-020	MICROCIRCUIT,LINEAR:QUAD COMPARATOR,LOW OFFSET LOW POWER, SURFACE MT,14 PIN PLASTIC SO14 DIP PKG
U11	1.00	52151	351-5248-040	MICROCIRCUIT,DIGITAL,DUAL 4-BIT BINARY COUNTER,SMT,SO14 PKG
U12	1.00	52151	351-5492-020	MICROCIRCUIT,AMPLIFIER,FAST VOLTAGE-OUT DC 440MHZ,95DB LOGARITHMIC 8-PIN MSOP PKG
U13	1.00	52151	351-5050-030	MICROCIRCUIT,DIGITAL:CLOCK DRIVER,MINIMUM SKEW1 INPUT TO 4 OUTPUTS,300PS SKEW,3V VCC,8-PIN SOIC
VR1	1.00	52151	351-5227-030	MICROCIRCUIT, LINEAR:VOLTAGE REGULATOR,+3.3V,1.5A LOW DROPOUT,LOW NOISE,5PIN
Z1	1.00	52151	379-5042-010	DIVIDER,POWER,RADIO FREQUENCY:2 WAY,5-500MHZ,50 OHM,1 WATT,0 DEG,SMT
Z2	1.00	52151	379-5042-010	DIVIDER,POWER,RADIO FREQUENCY:2 WAY,5-500MHZ,50 OHM,1 WATT,0 DEG,SMT

SECTION 7 - DRAWINGS

7-1. INTRODUCTION

This section of the Operation and Maintenance manual contains schematic and interconnect diagrams for the Type 800I HD Importer. Drawings have been reduced from large format engineering drawings.

The diagrams are arranged in ascending numerical order. An index of diagrams is provided in Table 7-1, in Ref. Des. order. Table 7-2 lists the diagrams in ascending numerical order.

Table 7-1. Index of Diagrams in Ref. Des. Order.

Ref. Des.	Diagram No.	Description
–	200397	800I HD Importer
A3	202224	GPS Clock Distribution CCA

Table 7-2. Index of Diagrams in Numerical Order.

Diagram No.	Rev.	Description	Ref. Des.
200397	1	800I HD Importer	–
202224	D	GPS Clock Distribution CCA	A3

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SECTION 8 - SUPPLEMENTAL DATA

8-1. INTRODUCTION.

This section of the Operation and Maintenance manual contains supplemental data for the Type 800I HD Importer. Documents have been reproduced with the consent of original vendors. Tabs have been used to identify the various vendors. An index of vendor items is provided in Table 8-1.

8-2. SITE SPECIFIC EQUIPMENT CONFIGURATION.

When site specific equipment configuration changes are necessary, pertinent data will be included behind this tab. Data in this section takes precedence over data presented elsewhere in this manual.

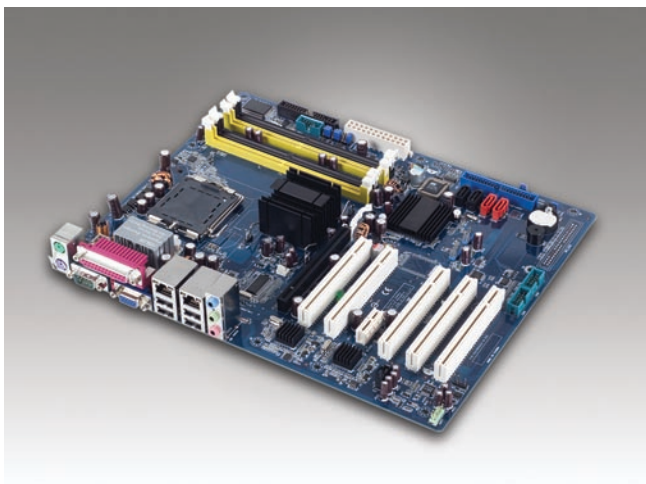
Table 8-1. Index of Vendor Data Items

Tab No.	Vendor Identification	Description
1	Advantech	ACP-2010MB0-30ZE 2U Rackmount Chassis User Manual AIMB-763G2-00A1E Motherboard Datasheet
2	Audio Science	ASI 5111 PCI Audio Card Datasheet
3	Orban	Optimod-PC 1101 PCI Audio Card Datasheet

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AIMB-763

Intel® LGA775 Core™ 2 Duo/Pentium® 4/
ATX with VGA, 4 COM, SW RAID, and Dual LAN



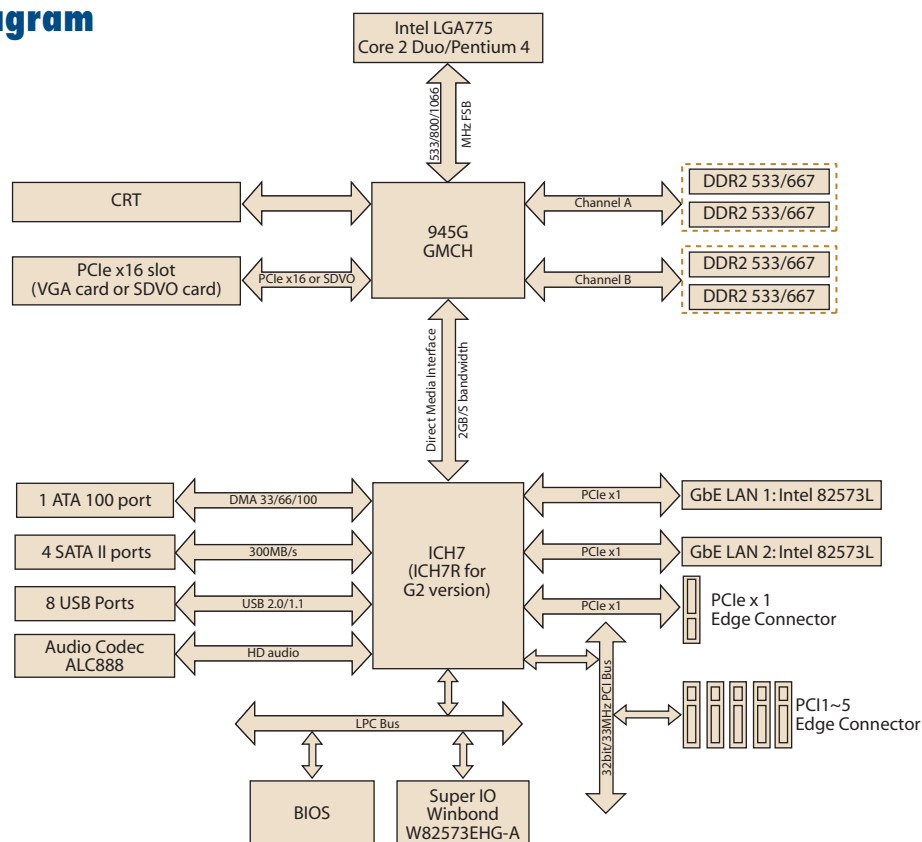
Features

- Supports Core™ 2 Duo FSB 800/1066 MHz
- Dual channel DDR2 533/667 SDRAM up to 4 GB
- Chipset integrated VGA sharing 224 MB system memory
- PCIe x16 slot for VGA card
- Supports 10/100/1000 Mbps Ethernet via dedicated PCIe x 1 bus
- Supports SATA RAID 0,1,5 and 10 for G2 version

Specifications

Processor System	CPU (45nm/65nm/90nm)	Intel Core 2 Duo	Intel Pentium dual-core	Intel Pentium 4	Intel Celeron D
	Max. Speed	E7400 2.8GHz	E2200 2.2 GHz	651 3.4 GHz	352 3.2 GHz
	L2 Cache	3 MB	1 MB	2 MB	512 KB/256K B
	Chipset	Intel 945G + ICH7 (ICH7R for G2 version)			
	BIOS	Award 8 Mbit, FWH			
	Front Side Bus	533/800/1066 MHz			
Expansion Slot	PCIe x16	4.0 GB/s per direction, 1 slot			
	PCIe x1	250 MB per direction, 1 slot			
	PCI	32-bit/33MHz, 5 slots			
Memory	Technology	Dual channel DDR2 533/667 MHz			
	Max. Capacity	4 GB			
	Socket	4 x 240-pin DIMM			
Graphics	Embedded	Intel GMA 950 sharing 224 MB system memory			
	Add-on	PCIe x16 slot			
Ethernet	Interface	10/100/1000 Mbps			
	Controller	GbE LAN1: Intel 82573L; GbE LAN2: Intel 82573L			
	Connector	RJ-45 x 2			
SATA II	Max. Data Transfer Rate	300 MB/s			
	Channel	4			
EIDE	Mode	ATA 100/66/33			
	Channel	1 (max. 2 devices) (2 for G2 version)			
I/O Interface	VGA	1			
	USB	8			
	Audio	3 (Line-out, Line-in, Mic-out)			
	Serial	2 (for VG version); 4 (for G2 version). COM2 supports RS-232/422/485			
	Parallel	1 (SPP/EPP/ECP)			
	FDD	1			
	PS/2	2 (1 x keyboard and 1 x mouse)			
	GPIO	-			
Watchdog Timer	Output	Interrupt, system reset			
	Interval	Programmable 1 ~ 255 sec/min			
Power Requirement	Power On	Pentium 4 3.8 GHz (800 MHz FSB), 4 x 1 GB DDR2 667 SDRAM			
		+5 V	+3.3 V	+12 V	
		3.10 A	1.54 A	9.90 A	
Environment		Operating			
	Temperature	0 ~ 60 °C (32 ~ 140 °F), depends on CPU speed and cooler solution.			Non-Operating
Physical Characteristics		-20 ~ 70 °C (-40 ~ 158 °F)			
	Dimensions (W x D)	304.8 x 244 mm (12" x 9.6")			

Board Diagram



Ordering Information

Part Number	GbE LAN	COM	SATA SW RAID	IDE RAID
AIMB-763VG-00A1E	1	2	None	None
AIMB-763G2-00A1E	2	4	Yes	Yes

Riser Card

Part Number	Description
AIMB-RP3PF-21A1E	2U riser card with 1PClex16 & 2PCI slot expansion

Bracket View



AIMB-763VG-00A1E



AIMB-763G2-00A1E

Packing List

Description	Quantity
FDD cable	x 1
IDE HDD cable	x 1
Serial ATA HDD data cable	x 2
Serial ATA HDD power cable	x 2
COM port cable kit	x 1
I/O port bracket	x 1
Startup manual	x 1
Utility CD	x 1

Accessories

Part Number	Description
1750000334	LGA775 CPU cooler up to 3.8 GHz (115 W), 4U, 5U and 7U chassis
1960022033T000	LGA775 CPU cooler for 2U chassis
1700006915	Power relay cable to activate ACP-4000 LED indicators
1700006916	Power relay cable to activate IPC-610H LED indicators
1700006917	PS/2 cable to active ACP-2010MB/2320MB/4000MB & IPC-510MB/610MB-H/7143/7220 keyboard/mouse function

ACP-2010MB

2U-High Rackmount Chassis for
ATX / MicroATX Motherboard

Trusted ePlatform Services

ADVANTECH

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Acknowledgements

The ACP-2010, AIMB-764, AIMB-763, AIMB-762, AIMB-760, AIMB-750, AIMB-744, AIMB-742, AIMB-740, AIMB-564, AIMB-562, AIMB-560, AIMB-556, AIMB-554, AIMB-552, AIMB-542, are trademarks of Advantech Co., Ltd. All other product names or trademarks are the properties of their respective owners.

On-line Technical Support

For technical support and service, please visit our support website at:
<http://www.advantech.com/support>

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this user manual for later reference.
3. Disconnect this equipment from AC outlet before cleaning. Do not use liquid or spray detergents for cleaning.
4. For pluggable equipment, the power outlet shall be installed near the equipment and shall be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
7. Do not leave this equipment in an environment unconditioned where the storage temperature under 0° C (32° F) or above 40° C (104° F), it may damage the equipment.
8. The openings on the enclosure are for air convection hence protect the equipment from overheating. DO NOT COVER THE OPENINGS.
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Place the power cord in a way that people can not step on it. Do not place anything over the power cord. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid being damaged by transient over-voltage.
13. Never pour any liquid into ventilation openings. This could cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If any of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well or you cannot get it to work according to user manual.
 - e. The equipment has been dropped and damaged.
 - f. The equipment has obvious signs of breakage.
16. CAUTION: The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.
17. THE COMPUTER IS PROVIDED WITH CD DRIVES COMPLY WITH APPROPRIATE SAFETY STANDARDS INCLUDING IEC 60825.

CLASS 1 LASER PRODUCT
KLASSE 1 LASER PRODUKT

-
18. This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
 - (1) this device may not cause harmful interference, and
 - (2) this device must accept any interference received, including interference that may cause undesired operation.
 19. CAUTION: Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges.
 20. CAUTION: Always ground yourself to remove any static charge before touching the motherboard, backplane, or add-on cards. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.
 21. CAUTION: Any unverified component could cause unexpected damage. To ensure the correct installation, please always use the components (ex. screws) provided with the accessory box.

A Message to the Customer

Advantech customer services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known. Your satisfaction is our primary concern. Here is a guide to Advantech's customer services.

To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical support

We want you to get the best performance possible from your products. If you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

Please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and can be easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice about application requirements or specific information on the installation and operation of any of our products.

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Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Initial Inspection

When you open the carton, please make sure that the following materials have been shipped:

- ACP-2010MB Chassis
- User Manual
- Warranty Card
- Accessory box with a package of screws (for fastening the motherboard, disk drives, ears and handles, etc.), a pair of keys, a plastic post, a pair of ears and handles.

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the ACP-2010MB mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the ACP-2010MB, check it for signs of shipping damage. (For examples: box damage, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also, please notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

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Chapter 1

General Information

This chapter provides general information about the ACP-2010MB.

Sections include:

- Introduction
- Specifications
- Power supply options
- Environment specifications
- Dimension diagram

1.1 Introduction

The ACP-2010MB is a 2U-high rackmount industrial computer chassis.

It meets a variety of application needs for filing, printing, e-mails and web serving. This powerful computing platform is suitable for mission-critical computer telephony applications, industrial automation, and factory management. A wide range of standard computing peripherals can be integrated with the chassis to meet different application needs for operation under harsh conditions 24 hours a day, 7 days a week.

1.2 Specifications

- **Construction:** Heavy-duty steel
- **Disk Drive Capacity:** One 5.25" disk drive bay and three 3.5" disk drive bay (for FDD or internal HDD)
- **LED Indicators on Front Panel:** Bi-color LEDs (green/red) for Power, Temperature, and Fan status; single-color LEDs (green) for HDD activity.
- **Switch and Buttons on Front Panel:** Power switch, System Reset button and Alarm Reset button.
- **Front I/O Interfaces:** Dual USB ports and PS/2 connector behind the door
- **Rear I/O Interfaces:** Reserved two 9-pin D-SUB openings
- **Security Protection:** The storage system, power switch, system reset button and alarm reset button are all behind the lockable door.
- **Cooling System:** Two 8 cm x 8 cm (47 CFM) easy-to-maintain cooling fans.
- **Air Filters:** Two easily maintained reusable filters near the front of the system fan and behind the front door.
- **Weight:** 10.7 kg (23.5 lbs)
- **Dimensions (W x H x D):** 482 x 88 x 480 mm (19" x 3.46" x 18.9")

1.3 Power Supply Options

Table 1.1: Power supply options

Model Name	1757000007G	1757000105G
Watts	300 W (ATX, PFC) (single)	400 W (ATX, PFC) (single)
Input rating	100 ~ 240 Vac (Full range)	100 ~ 240 Vac (Full range)
Output voltage	+5 V @ 35 A, +3.3 V @ 20 A, +12 V @ 16 A, -5 V @ 0.5 A, -12 V @ 1 A, +5 Vsb @ 2 A	+5 V @ 25 A, +3.3 V @ 20 A, +12 V @ 28 A, -5 V @ 0.5 A, -12 V @ 0.5 A, +5 Vsb @ 2 A
Minimum load	+5 V @ 3 A, +3.3 V @ 1 A, +12 V @ 2 A, -5 V @ 0.05 A, -12 V @ 0.05 A, +5 Vsb @ 0.1 A	+5 V @ 3 A, +3.3 V @ 1 A, +12 V @ 2 A, +5 Vsb @ 0.1 A
MTBF	97,800 hours @ 25° C	100,000 hours @ 25° C
Safety	UL/TUV/CB/CCC	UL/TUV/CB/CCC

1.4 Environmental Specifications

Table 1.2: Environmental specifications

Environment	Operating	Non-operating
Temperature	0 to 40° C (32 to 104° F)	-20 to 60° C (-4 to 140° F)
Humidity	10 to 85% @ 40° C, non-condensing	10 to 95% @ 40° C, non-condensing
Vibration	1 Grms	2 G
Shock	10 G with 11 ms duration, half sine wave	30 G
Safety	CE compliant	

1.5 Dimension Diagram

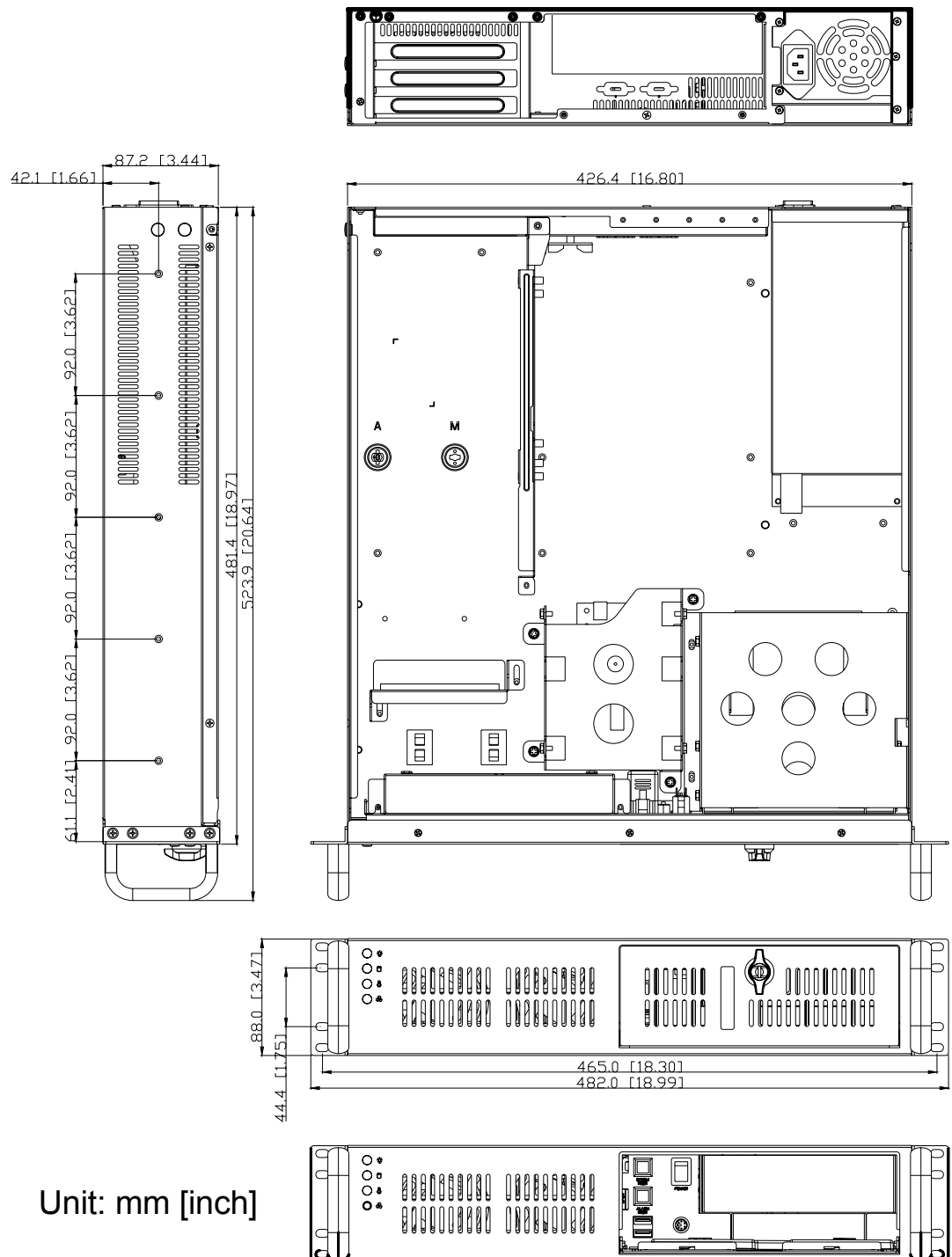


Figure 1.1 Dimension Diagram

Chapter 2

System Setup

This chapter introduces the installation process.

Sections include:

- Installing a motherboard
- Installing a riser card or add-on cards
- Installing disk drives
- Attaching the ears and handles

The following procedures instruct users to install a motherboard, add-on cards, and disk drives into the ACP-2010MB. Refer to Appendix A, the Exploded Diagram and the Parts List for more detailed information about parts for the ACP-2010MB.

Note! *Use caution when installing or operating the components with the chassis open. Be sure to turn off the power, unplug the power cord and ground yourself by touching the metal chassis before you handle any components inside the machine.*



2.1 Removing the Top Cover

To remove the top cover, please proceed as shown below.

1. Loosen five screws on the rear and both sides of the top cover.
2. Pull the top cover backwards and then lift it up.

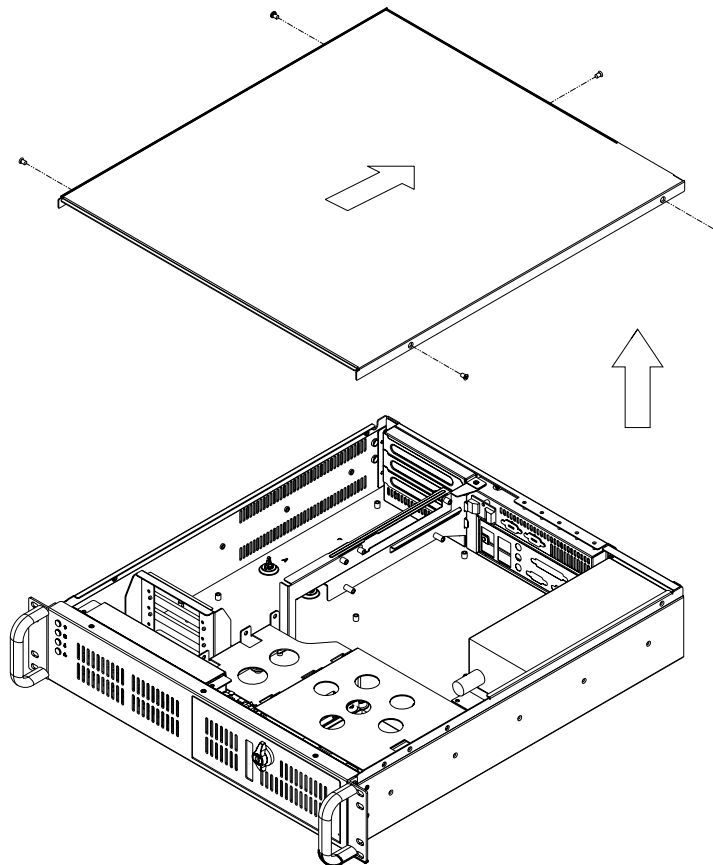



Figure 2.1 Removing the chassis top cover

2.2 Installing the Motherboard

The ACP-2010MB can support an ATX / MicroATX motherboard with up to three add-on cards via the expanded riser card, or seven low profile add-on cards via the optional special rear I/O bracket.

To install the motherboard, please proceed as follows:

Note!  Use caution when installing a motherboard. We highly recommend choosing a CPU cooler which is lower than 67 mm to avoid component interference between the motherboard and the chassis, and to ensure good air flow inside the chassis.

1. Remove the card holder by loosening the two screws.
2. A yellow label is located inside of the chassis bottom. (see Figure 2.2) The label shows the plastic post locations for attaching specific Advantech motherboards.

Model \ Mark	Mark	
	A	M
ATX motherboard	✱	
MicroATX motherboard		✱
Special: AIMB-744 AIMB-750 AIMB-760		

The plastic post is in the accessory box. Be sure to attach the post onto the correct location.

Figure 2.2 Yellow label indicating plastic post locations

3. Users can find the plastic post in the accessory box. Insert the plastic post to the correct location and then rotate counterclockwise to fasten it onto the chassis (see Figure 2.3).
4. Attach the motherboard I/O shielding onto the rear plate first. Then fasten the motherboard onto the chassis (see Figure 2.4).
5. If you don't need to install a riser card and an add-on card, return the card holder to its original position and fasten it.
6. Connect the 20-pin (or 24-pin) ATX power connector and the 4-pin +12 V power connector from the power supply to the motherboard
7. Connect the 9-pin USB wire, PS/2 wire, Power switch wire, and the System Reset switch wire from the chassis to the motherboard.

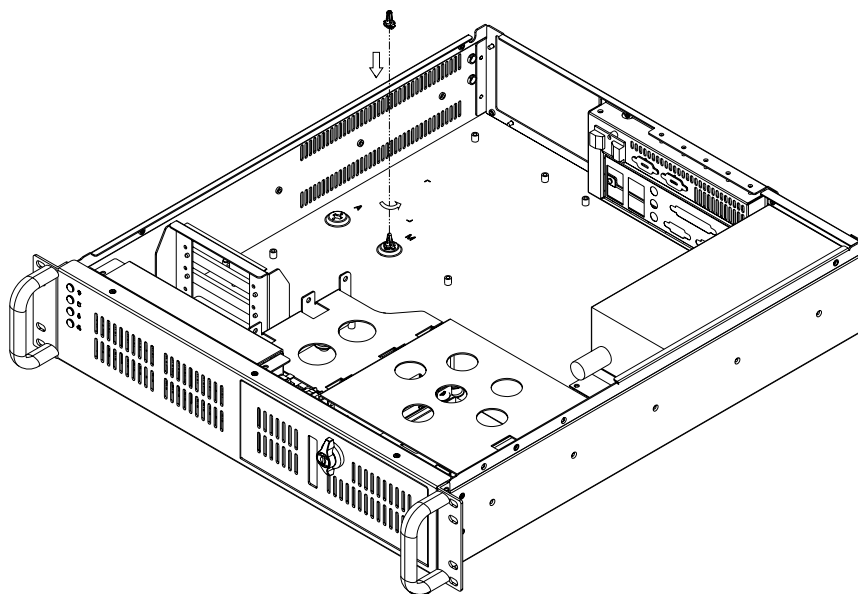


Figure 2.3 Fasten the plastic post

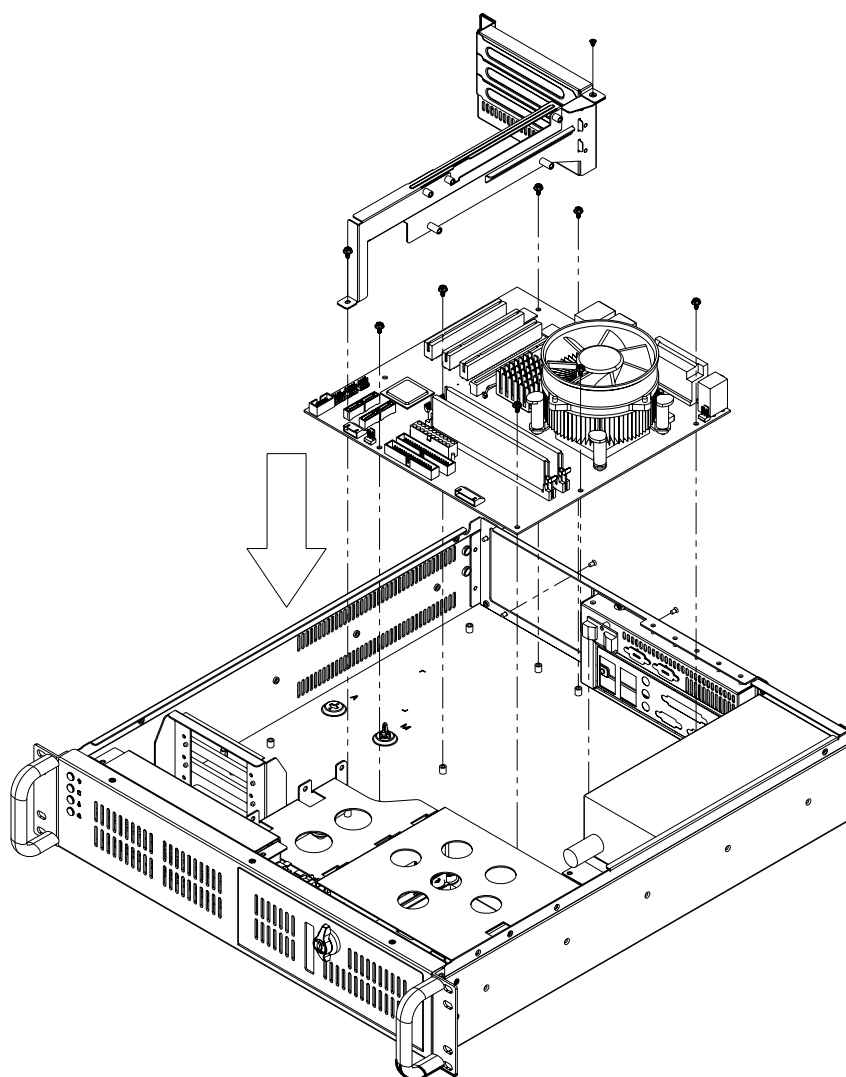


Figure 2.4 Installing a motherboard

2.3 Installing a Riser Card and Add-on Cards

The ACP-2010MB supports up to three add-on cards via the riser card. To install the riser card and one or more add-on cards, please proceed as follows:

1. Fasten the riser card to the riser card holder with the four screws. Then insert this unit into the slot on the motherboard. (See Figure 2.5.)
2. Remove the corresponding I/O bracket attached to the rear plate of the chassis. Insert an add-on card vertically into the proper slot on the riser card. For full-length cards, please make sure that the card bracket has been inserted properly and the other edge of the card has been inserted into the plastic guiding fillister. Then fasten the screws on the top of the I/O bracket. (see Figure 2.6)
3. Repeat Step 2 if there is more than one add-on card to be installed.
4. Replace the riser card holder and fasten it onto the chassis.

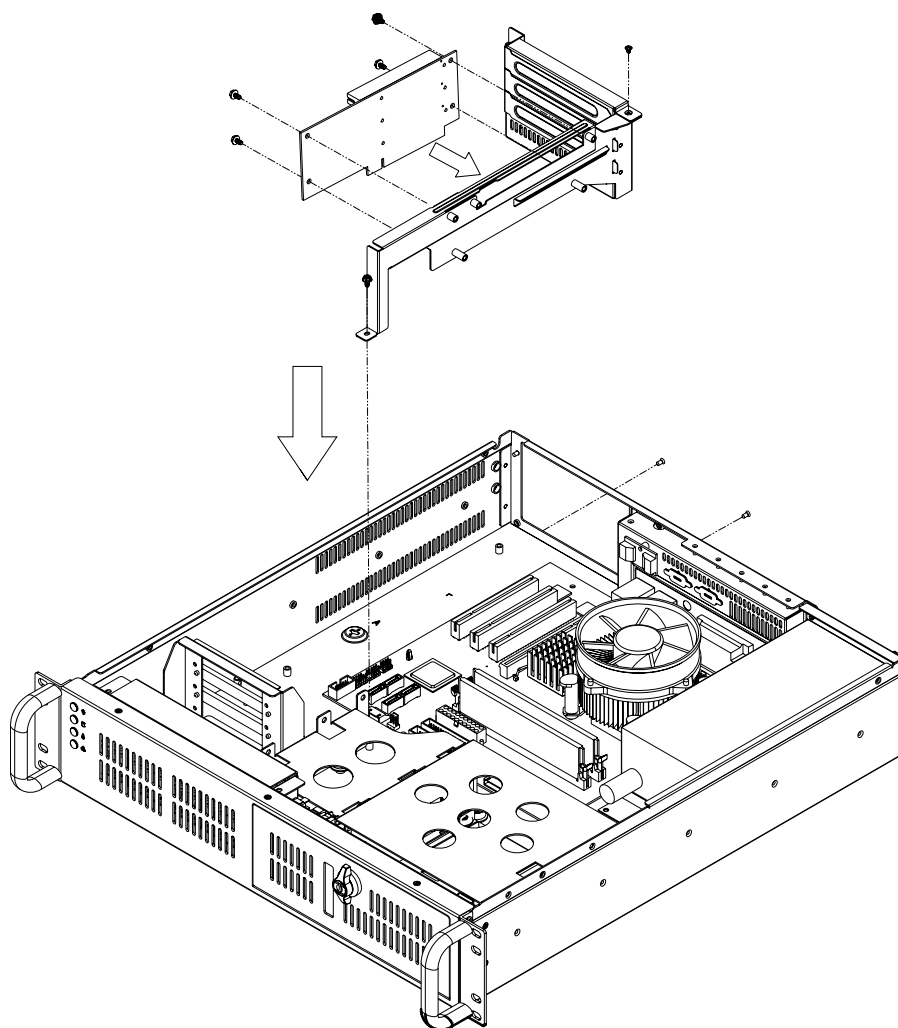


Figure 2.5 Installing a riser card

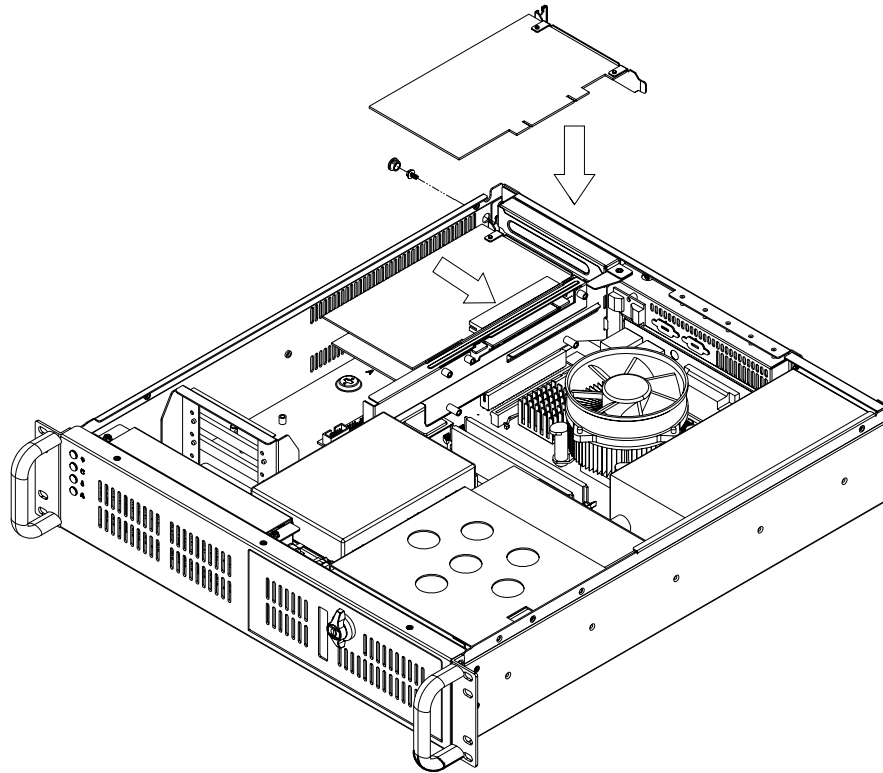


Figure 2.6 Installing an add-on card

Note! *These riser cards are specially designed to support Advantech AIMB-7XX and AIMB-5XX series motherboards. There may be compatibility issues if used with other vendor's motherboards.*



If you have the ACP-2010MB with the low-profile rear I/O bracket, then simply install the low-profile add-on card to the selected PCI/PCIe slot on the motherboard, and fasten the card securely.

2.4 Installing Disk Drives

The ACP-2010MB supports one 5.25" optical disk drive and three 3.5" disk drives (one FDD and two internal HDDs).

To install the 3.5" internal HDD, 5.25" optical disk drive and the 3.5" FDD, please follow these steps for installation:

1. To install the 3.5" internal HDD, simply release the four screws on top of the disk drive bracket.
2. Insert the disk drive into the proper location in the bracket and secure them with the screws provided. (see Figure 2.7)
3. Return the bracket with the disk drive in the original position and fasten it with the screws.

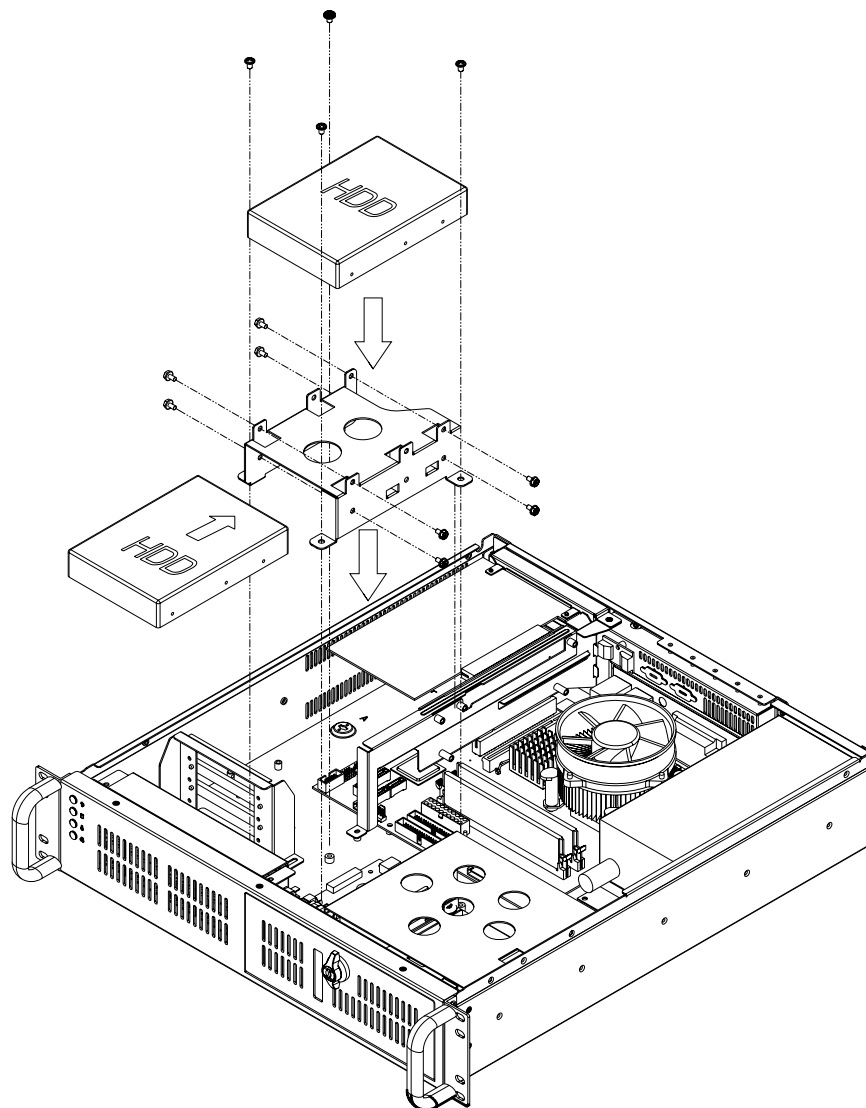


Figure 2.7 Installing the internal HDD

4. To install the optical disk drive and 3.5" FDD, undo the screws on the 5.25" disk drive bracket.
5. Undo the screws on each side of the 5.25" disk drive bracket to remove the front covers.
6. Slide the optical disk drive and the FDD into the bracket and fasten it on both sides with the eight screws provided (see Figure 2.9). Return the 5.25" disk drive bracket with the disk drives in the original position and reattach it inside the chassis with the original screws.
7. Connect the suitable IDE or SATA cables from the motherboard to the 3.5" internal HDD, the optical disk drive, or FDD. Then, plug the power connector into each disk drive.

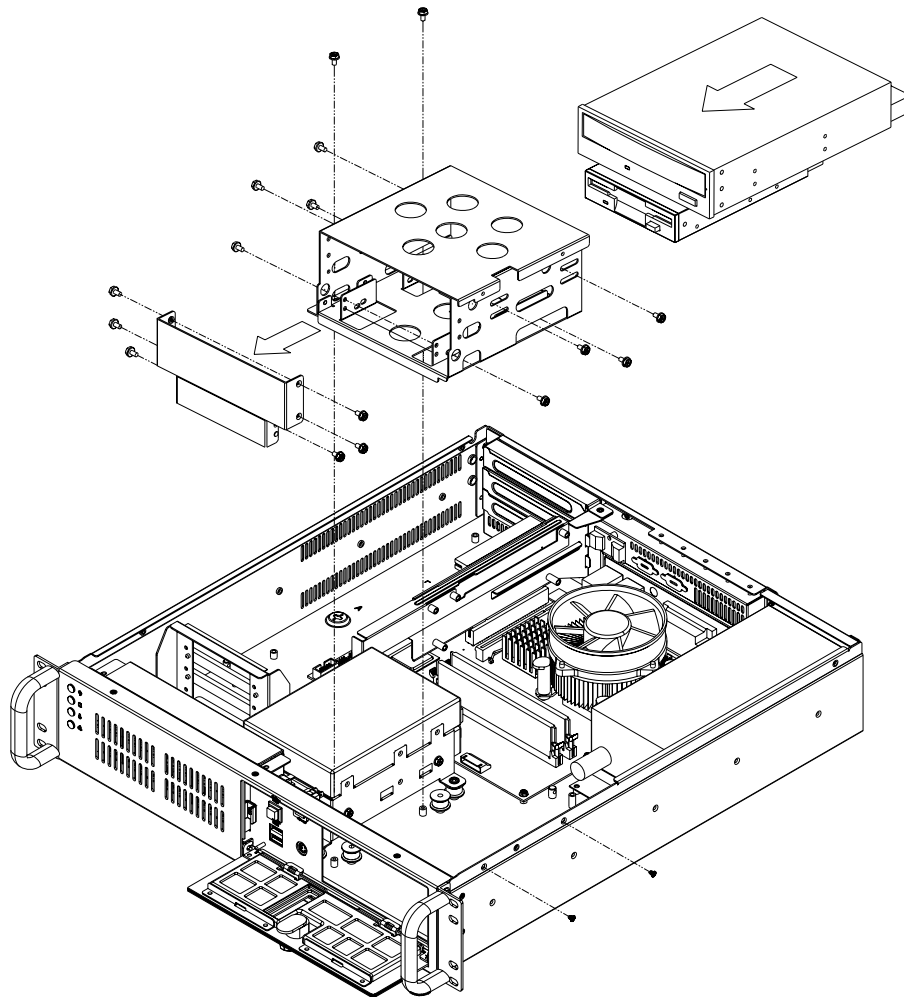


Figure 2.8 Installing the optical disk drive and FDD

2.5 Attaching the Ears and Handles

There are a pair of ears and handles in the accessory box, which may be added to the front end of the chassis for easy handling.

To install the handles onto the chassis, refer to Figure 2.9 and attach the ears to the chassis, and the handles to the ears on the front-right and front-left edges with the screws provided.

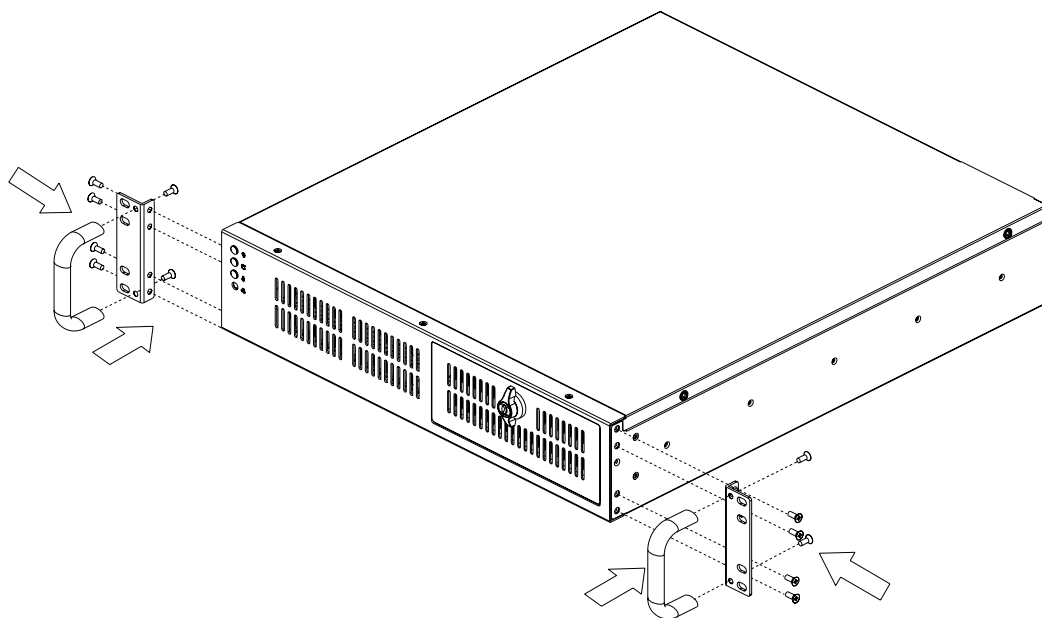


Figure 2.9 Attaching the ears and handles

Chapter 3

Operation

This chapter introduces the system operation information.

Sections include:

- The front panel
- The rear panel
- Replacing the cooling fan
- Cleaning the filters
- Replacing the power supply

3.1 The Front Panel

The front panel features a lockable door and four LED indicators. It provides front accessible, dual USB ports and a PS/2 connector. The front door can be closed with or without a key using the user-friendly rotary lock. Behind the opening door is a Momentary Power switch, a System Reset button, and an Alarm Reset button. Specific functions are described below:

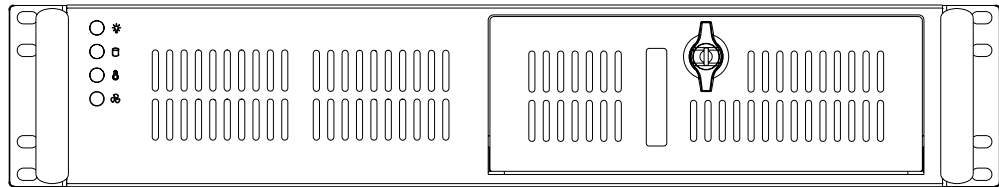


Figure 3.1 Front panel with door closed

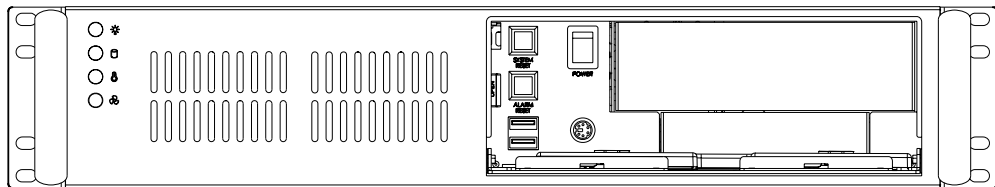


Figure 3.2 Front panel with door open





3.1.1 Switch, Button and I/O Interfaces

- **Momentary Power switch:** Press this switch to turn the system power on or off. Please use the system shutdown or press this switch for few seconds to turn off the system ATX power.
- **Alarm Reset button:** Whenever a fault occurs in the system (e.g., fan failure or chassis overheating) an audible alarm will be activated. Pressing this button will stop the alarm from beeping.
- **System Reset button:** Press this button to reboot the system.
- **Dual USB port:** For connecting a wide range of USB devices for data transfer, backup or input.
- **PS/2 connector:** For connecting a keyboard or mouse depending on the motherboard design.

3.1.2 LED Indicators for System Status

Four LEDs are placed on the left side of the front panel to indicate system health and activity. Refer to Table 3.1 for an LED definition summary.

Table 3.1: LED indicator functions

LED	Description	Green	Red
	System power	Normal	Abnormal
	Hard disk drive activity	Data access	No light
	Temperature in the chassis	Normal	Abnormal
	Cooling fan status	Normal	Abnormal

When the system power is on, the power LED is **Green**.

If the power LED is **RED**, it indicates a redundant power supply module failure. To stop the alarm beep, press the **Alarm Reset** button. Examine the redundant power supply module right away and replace the failed module with a working one.

If the fan LED is **RED**, it indicates a failed cooling fan, and the alarm is also activated. To stop the alarm beep, press the **Alarm Reset** button and then replace the failed fan with a working one immediately.

If the temperature LED is **RED**, it means that inside of the chassis is overheated (more than 50° C). An audible alarm will be activated. To stop the alarm beep, press the **Alarm Reset** button. Inspect the fan filter and the rear section of the chassis immediately. Make sure the airflow inside the chassis is smooth and not blocked by dust or other particles.

3.2 The Rear Panel

The rear panel comes with 3-slot I/O brackets, two reserved 9-pin D-SUB openings and a motherboard I/O opening. (see Figure 3.3)

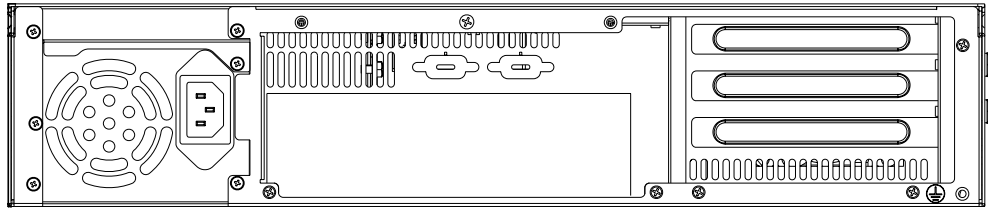


Figure 3.3 Rear panel with standard I/O brackets

There is an optional rear I/O bracket for the low profile add-on cards (see Figure 3.4).

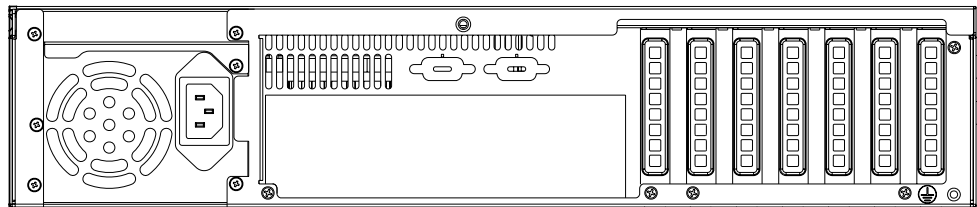


Figure 3.4 Rear panel with low profile I/O brackets

There is a ground screw with a washer located on the lower right of the rear panel. This will protect the system in case of electrical leakage.

3.3 Replacing the Cooling Fans

There are two easily maintained system cooling fans in the chassis. The fans provide the system with ample cooling by blowing air toward the rear. To replace the fan, proceed as follows:

1. Remove the top cover.
2. Unplug the power connectors from the fans.
3. Loosen the two screws on the fan bracket and gently pull it out.
4. Loosen four screws on the fan in the bracket. Remove the broken fan and replace it with a working one.
5. Fix the working fan onto the bracket with the four screws (see Figure 3.5).
6. Replace the entire fan unit into the chassis by tightening the two screws and reconnect the fan power connectors.
7. Replace the top cover and fasten it.

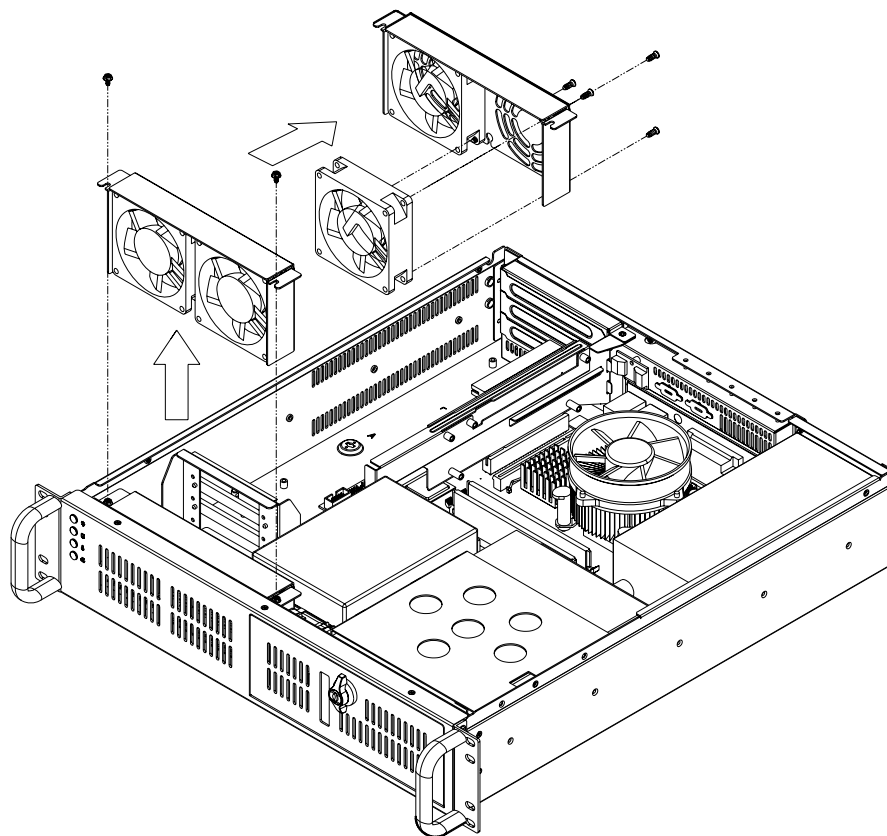


Figure 3.5 Replacing the cooling fan

3.4 Cleaning the Filters

The filter functions to block dust or particles from the work environment and greatly helps to extend the longevity of the system. It is recommended to check, clean and replace the filters periodically. Two reusable, washable filters are located behind the front door and in front of the system fans.

To remove and clean the filter, proceed as follows:

1. Open the front door.
2. To remove the door filter, simply push the hook to pull it out.
3. To pull out the fan filter, push the hook and slide it right wards (see Figure 3.6).
4. Clean the filter with a soft brush or wash the dust away from the filter with flowing water and let it dry thoroughly.
5. Replace them inside the unit.

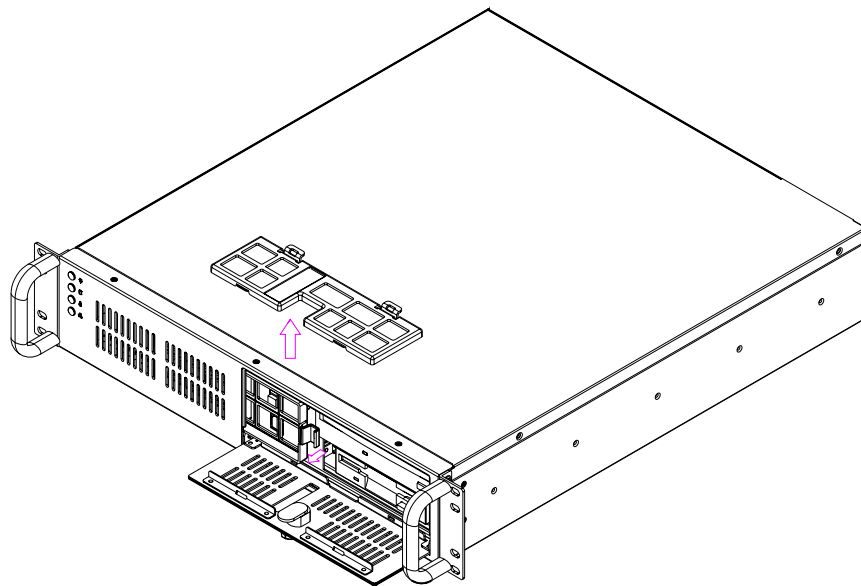


Figure 3.6 Cleaning the filters

3.5 Replacing the Power Supply

The ACP-2010MB supports either a 300 W or a 400 W 2-U-high power supply. To replace the power supply, proceed as follows:

1. Unplug the power cord from the power supply.
2. Remove the top cover.
3. Unplug the 20-pin (or 24-pin) ATX power connector and 4-pin +12 V power connector from the motherboard, as well as the power connectors from all disk drives.
4. Loosen the three screws on the rear plate and the two screws on the power supply bracket and gently remove it (see Figure 3.7).
5. Replace the power supply with a new one and fasten it onto the chassis.
6. Plug in the 20-pin (or 24-pin) ATX power connector and the 4-pin +12 V power connector to the motherboard. Plug the other power connectors to the disk drives and peripherals.
7. Replace the top cover. Then plug in the power cord.

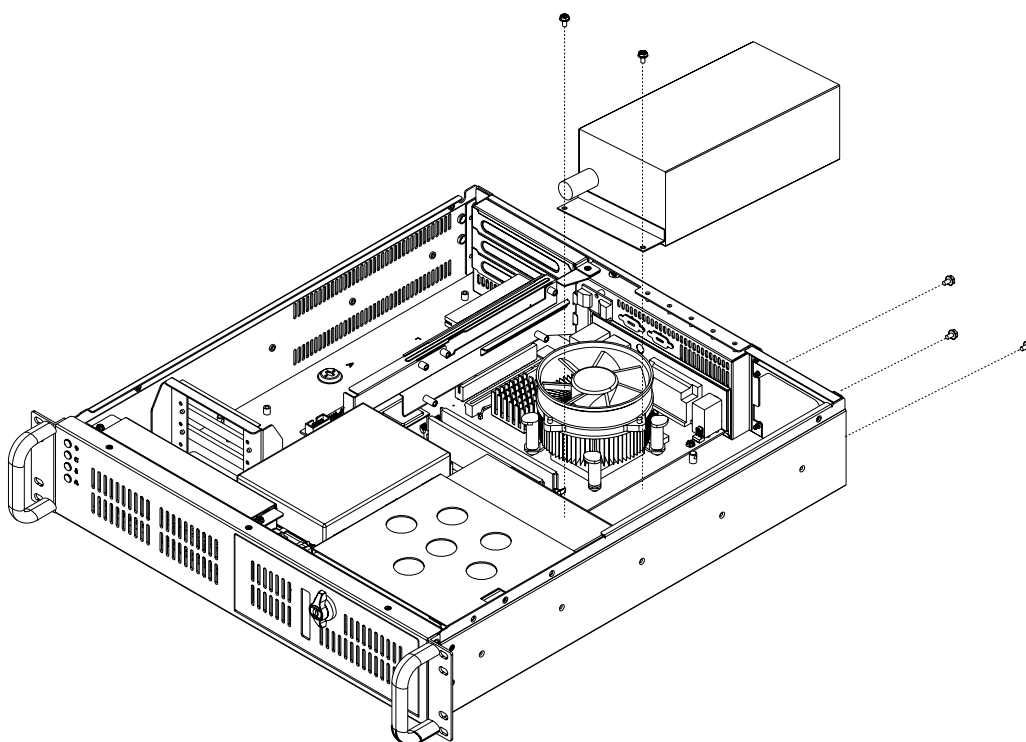


Figure 3.7 Replacing the power supply

Chapter 4

Alarm Board

This chapter introduces the alarm board and thermal sensor specifications.

Sections include:

- Alarm board layout
- Alarm board specifications
- Thermal sensor
- Sensor I.D. number setting

The alarm board is located under the 3.5" disk drive bay. The alarm board provides system detection functions that monitor the entire status of the computer system, including: thermal conditions, fans, power supply and HDD operation. Any problems with the system are reported through audible alarms and LED indicators.

The alarm board sounds an audible alarm whenever:

1. Any power supply module of the redundant power supply fails;
2. One of the system cooling fans fails;
3. The internal temperature of the chassis becomes too high.

To stop the alarm beep, press the Alarm Reset button on the front panel and then take the necessary action to fix it.

4.1 Alarm Board Layout

The layout and detailed specifications for connectors on the alarm board are shown in this diagram:

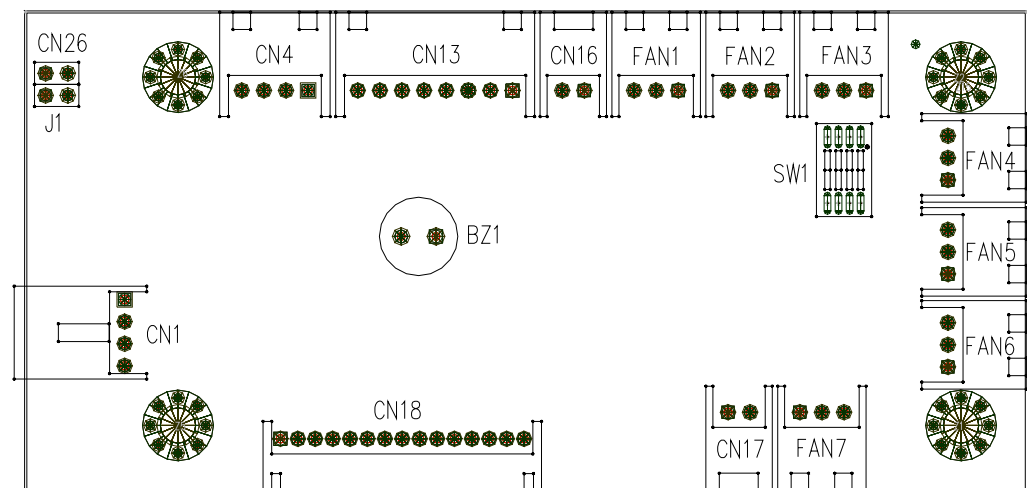


Figure 4.1 Alarm board layout

4.2 Alarm Board Specifications

- **Input Power:** +5 V, +12 V
- **Input Signals:**
 - 7 "fan" connectors
 - One "thermal sensor" connector (supports up to 8 thermal sensors connected in a series)
 - One "power good" input
 - One "alarm reset" input
 - One "voltage signal" connector (connected from the motherboard, and supports six voltages: +- 12 V, +- 5 V, +3.3 V, +5 Vsb)
 - One "hard disk LED" connector (connected from the motherboard)
- **Output Signals:**
 - One "LED board" connector
 - One "buzzer" output

4.2.1 Connectors & Pin Definition

Table 4.1: CN1, Auxiliary external power connector, standard mini 4-Pin power connector

Pin 1	+12 V	Pin 3	GND
Pin 2	GND	Pin 4	+5 V

Table 4.2: CN4, Thermal sensor (LM75) connector

Pin 1	+5 V	Pin 3	T_SDAT
Pin 2	T_SCLK	Pin 4	GND

Table 4.3: CN13, Voltage detect. input connector

Pin 1	+5 Vsb	Pin 5	+5 V
Pin 2	GND	Pin 6	+3.3 V
Pin 3	GND	Pin 7	-12 V
Pin 4	-5 V	Pin 8	+12 V

Table 4.4: CN16, Power good input connector

Pin 1	Power Good	Pin 2	GND
--------------	------------	--------------	-----

Table 4.5: CN17, Alarm reset connector

Pin 1	ALARM RESET	Pin 2	GND
--------------	-------------	--------------	-----

Table 4.6: CN18, Output connector to LED board

Pin 1	GND	Pin 9	Temperature Good
Pin 2	+5 V signal	Pin 10	Temperature Fail
Pin 3	+12 V signal	Pin 11	FAN Good
Pin 4	-5 V signal	Pin 12	FAN Fail
Pin 5	-12 V signal	Pin 13	N/A
Pin 6	HDD_1	Pin 14	+3.3 V signal
Pin 7	Power Good	Pin 15	+5 Vsb signal
Pin 8	Power Fail		

Table 4.7: CN26, HDD LED connector

Pin 1	HLED_ACT	Pin 2	N/A
--------------	----------	--------------	-----

Table 4.8: FAN1~FAN7, Fan connectors

Pin 1	GND	Pin3	FAN_DEC
Pin 2	+12 V		

Table 4.9: J1, External buzzer

Pin 1	Buzzer	Pin 2	+5 V
--------------	--------	--------------	------

Table 4.10: SW1, Fan number select switch


Pin 1	GND	Pin 5	GND
Pin 2	FAN_SEL1	Pin 6	FAN_SEL3
Pin 3	GND	Pin 7	GND
Pin 4	FAN_SEL2	Pin 8	RESET

4.2.2 Switch Settings

The alarm board is designed to connect with up to 7 fans. Users can set the fan number by adjusting the switch, SW1, on the alarm board.

Table 4.11: SW1, Fan number setting

Fan Number	SW 1-1	SW 1-2	SW 1-3	SW 1-4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2 (default)	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF

Note!  Connect the fan connectors in the correct sequence: if two fans are set on SW1, the correct method is to connect them to connectors FAN1 and FAN2. If the two fans are connected to other fan connectors, out of sequence, such as FAN1 and FAN3 or FAN2 and FAN3 or FAN3 and FAN4, instead of FAN1 and FAN2, then the alarm will not function correctly.

4.3 Thermal Sensor

The ACP-2010MB is configured with a thermal sensor on the backside of the chassis (see Figure 4.2).

Thermal sensor

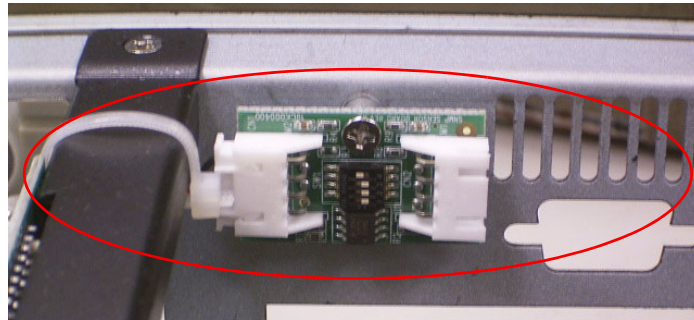


Figure 4.2 Thermal sensor location

Refer to Figure 4.3 for a diagram of the thermal sensor module layout.

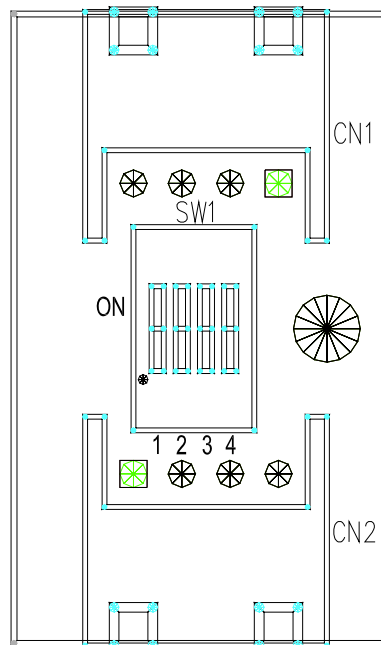


Figure 4.3 Thermal sensor module

The default sensor I.D. number is 1. Users can refer to Table 4.13 to set the sensor I.D. number by adjusting the switch, SW1, on the sensor module.

Table 4.12: CN1 & CN2, Temperature sensor connector

Pin 1	+5 V	Pin 3	T_SDAT
Pin 2	T_SCLK	Pin 4	GND

Table 4.13: SW1, Thermal sensor I.D. setting

Sensor I.D. No.	SW 1-1	SW 1-2	SW 1-3	SW 1-4
1 (default)	OFF	OFF	OFF	ON
2	OFF	OFF	ON	ON
3	OFF	ON	OFF	ON
4	OFF	ON	ON	ON
5	ON	OFF	OFF	ON
6	ON	OFF	ON	ON
7	ON	ON	OFF	ON
8	ON	ON	ON	ON

Appendix **A**

Exploded Diagram and
Parts List

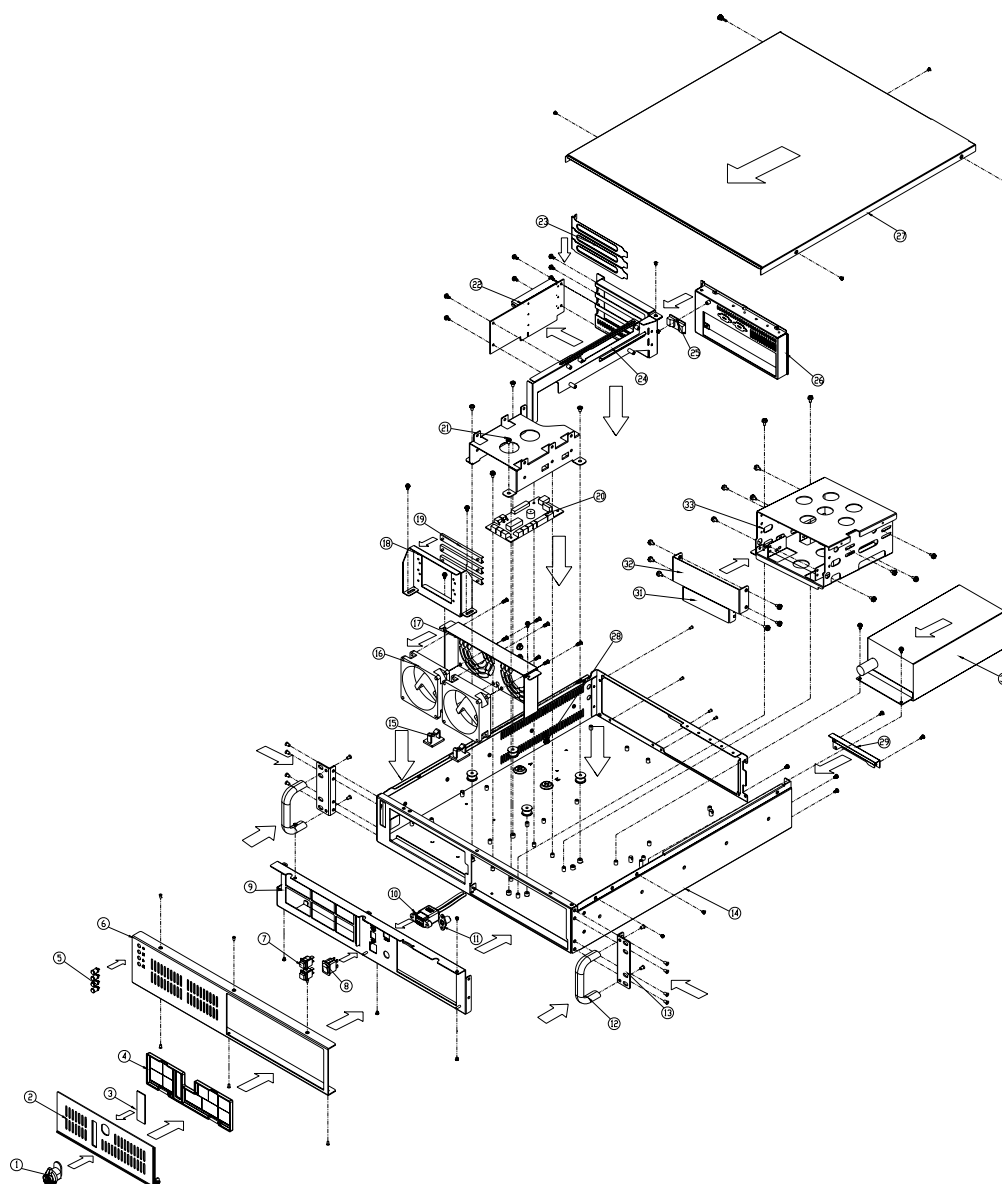


Figure A.1 Exploded Diagram

Table A.1: Parts List

1	Key Set	13	Rack Mounting	25	Thermal Board
2	Front Panel	14	Chassis	26	Rear Plate
3	Transparent Sheet	15	Wire Saddle	27	Top Cover
4	Air Filter	16	System Fan	28	Motherboard Plastic Post
5	LED Holder	17	Fan Bracket	29	Power Bracket
6	Front Panel	18	Guide Rail Bracket	30	Power Supply
7	Cable	19	Add-on Card Guide Rail	31	3.5" FDD Cover
8	ATX Cable	20	Alarm Board	32	5.25" FDD Cover
9	Front Plate	21	Internal HDD Bracket	33	HDD Tray
10	USB	22	Riser Card (Optional)		
11	PS/2	23	I/O Bracket		
12	Handles	24	Card Support Beam		

Appendix **B**

Motherboard & Riser
Card Options

B.1 Motherboard Options

The ACP-2010MB supports a variety of Advantech ATX / MicroATX motherboards described below. Contact a local sales representative for more detailed information.

Table B.1: ATX motherboard options

Model Name	Bus				
	PCI	PCI/ISA	ISA	AGP	SATA
AIMB-764	1 (PCIe x16) 1 (PCIe x4) 5 (PCI 32-bit)	-	-	-	5
AIMB-763	1 (PCIe x 16) 1 (PCIe x 1) 5 (PCI 32-bit)	-	-	-	4
AIMB-762	1 (PCIe x16) 1 (PCIe x4) 5 (PCI 32-bit)	-	-	-	4
AIMB-760	1 (PCIe x1) 5 (PCI 32-bit)	-	-	-	4
AIMB-750	2 (PCI-X 64-bit) 4 (PCI 32-bit)	-	-	1 (4X)	2
AIMB-744	2 (PCI-X 64-bit) 4 (PCI 32-bit)	-	-	1 (8X)	2
AIMB-742	(32-bit)	1	1	1 (8X)	-

Table B.2: MicroATX motherboard options

Model Name	Bus		
	PCI	AGP	SATA
AIMB-556	1 (PCIe x16) 1 (PCIe x4) 2 (PCI 32-bit)	-	3
AIMB-554	1 (PCIe x16) 1 (PCIe x4) 2 (PCI 32-bit)	-	2
AIMB-552	3 (PCI 32-bit)	-	2
AIMB-542	3 (PCI 32-bit)	1 (8x)	2

B.2 Riser Card Options

The riser card is specially designed to support Advantech AIMB series of motherboards. Users can contact a local sales representative for detailed information.

Table B.3: Riser card options

Model Name	Interface	Expansion Slots	Compatible Motherboards
AIMB-R4301	PCIe x4	3 PCIe x1	AIMB-764 / 762 / 556 / 554; 762 & 554 only support one PCIe x 1 (in the lowest slot)
AIMB-R430P	PCIe x4	3 PCI	AIMB-764 / 762 / 556 / 554
AIMB-R431F	PCIe x 16 + PCIe x 4	1 PCIe x 16 + 2 PCIe x 1	AIMB-764 / 762 / 556 / 554; 762 & 554 only support one PCIe x 1 (in the lowest slot) except one PCIe x 16
AIMB-RP30P	PCI	3 PCI	AIMB-760 / 750 / 744 / 742 / 560 / 552; AIMB-542 only supports one PCI (in the lowest slot)
AIMB-RP3PF	PCIe x 16 + PCI	1 PCIe x 16 + 2 PCI	AIMB-763/564/562
AIMB-RH31P	PCI + PCIe x1	2 PCI + 1 PCIe x1	AIMB-760

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Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

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1 DESCRIPTION

The ASI5111 is a professional PCI audio adapter designed for use in radio broadcast production.

The adapter offers two stereo record stream from either a balanced analog input or AES/EBU digital input and four stereo play streams mixed to both a balanced analog output and an AES/EBU digital output.

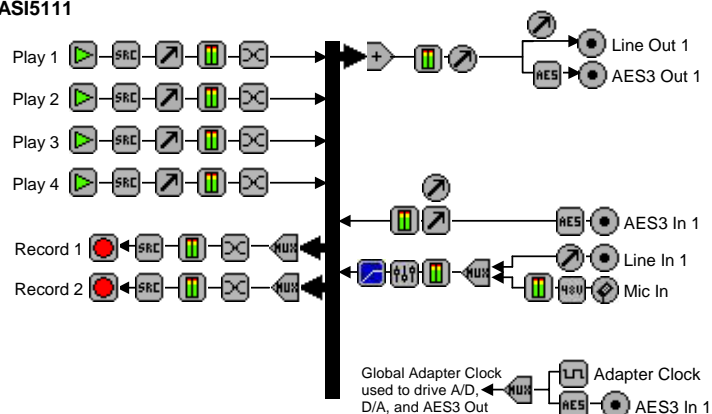
Also included is a microphone input, with low noise pre-amp and a 48V phantom supply.



2 FEATURES

- Four stereo streams of PCM playback
- Two stereo streams of PCM record.
- Balanced stereo analog input and output
- AES/EBU or S/PDIF digital input and output (software selectable).
- Low noise microphone input with 48V phantom supply and DSP based compressor/limiter and 3-band equalizer.
- 24bit analog-to-digital and digital-to-analog converters - 100dB SNR and 0.0025% THD+N.
- 11 to 96kHz sample rates.
- MRX™ multi rate mixing technology supports digital mixing of multiple sample rates.
- SoundGuard™ transient voltage suppression protects against lightning and other high voltage surges on all I/O
- Up to 8 cards in one system.
- Windows 2000/XP/Server 2003/Vista and Linux software drivers available.

ASI5111



Key:

Record Stream	Level	Meter	Compander
Play Stream	Mixer	Sample Rate Converter	Equalizer
Input/Output	Multiplexer	Channel Mode	Phantom Power
Volume	AES/EBU Tx/Rx	Clock Source	Mic Input

3 SPECIFICATIONS

BALANCED INPUT/OUTPUT

Connector	DB-9 Female
Input Level	-10 to +20dBu in 1dBu steps
Input Impedance	20K ohms
Output Level	-10 to +20dBu in 1dBu steps
Load Impedance	600ohms or greater
S/N Ratio [1]	> 100dB (record or play)
THD+N [2]	< 0.0025% (record or play)
Sample Precision	24bit Oversampling
Frequency Response	20Hz to 20kHz +/-0.25dB 20Hz to 40kHz +0.25/-5dB[3]

MICROPHONE INPUT

Connector	¼" TRS jack
Input Gain	20, 40 and 60dB software adjustable
Input Impedance	11K ohms (+ or – to ground)
Phantom Power	48V +/- 4V, software selectable on and off.
S/N Ratio [1]	90dB @ 40dB gain
THD+N [2]	0.005% @ 40dB gain
Frequency Response	20Hz to 20kHz +/-0.5dB 20Hz to 40kHz +0.5/-5dB [3]

DIGITAL INPUT/OUTPUT

Type	AES/EBU (EIAJ CP-340 Type I / IEC-958 Professional) S/PDIF (EIAJ CP-340 Type II / IEC-958 Consumer) (software selectable)
Connector	DB-9 Male
Sample Rates	32, 44.1, 48, 64, 88.2 and 96kHz
Sample Precision	24bit

SAMPLE RATE CLOCK

Internal	32, 44.1, 48, 64, 88.2 and 96kHz
AES/EBU In	32, 44.1, 48, 64, 88.2 and 96kHz

SIGNAL PROCESSING

DSP	Texas Instruments TMS320C6711 @135MHz
Memory	8MB
Audio Formats	8 bit unsigned PCM 16bit signed PCM 32bit IEEE floating point PCM

BREAKOUT CABLES (INCLUDED)

Analog	CBL1001: DB-9 to 2 in and 2 out XLR
Digital	CBL1003: DB-9 to 1 in and 1 out XLR

GENERAL

Bus	Universal 32bit PCI (3.3V or 5V signaling)
Dimensions	PCI form factor – 6.75" x 3.9" x 0.6" (172mm x 100mm x 15mm)
Weight	8 oz (227g) max
Operating Temperature	0C to 70C
Power Requirements	+5V @ 600mA, +12V @ 150mA, -12V @ 70mA

[1] - S/N Ratio is the difference between a 1kHz digital full-scale sinewave and digital zero using an A weighting filter

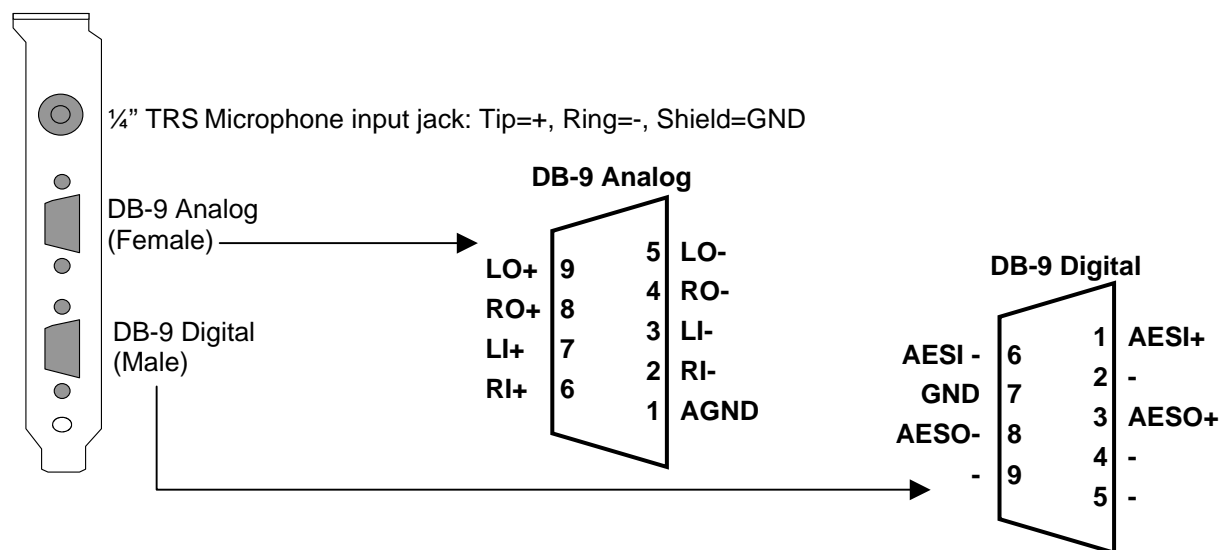
[2] - THD+N measured using a +20dBu 1kHz sinewave sampled at 48kHz and A weighting filter

[3] – Using a 96kHz sampling rate

4 REVISIONS

Date	Description
10 June 2009	Updated format slightly. Added new block diagram.

5 CONNECTORS

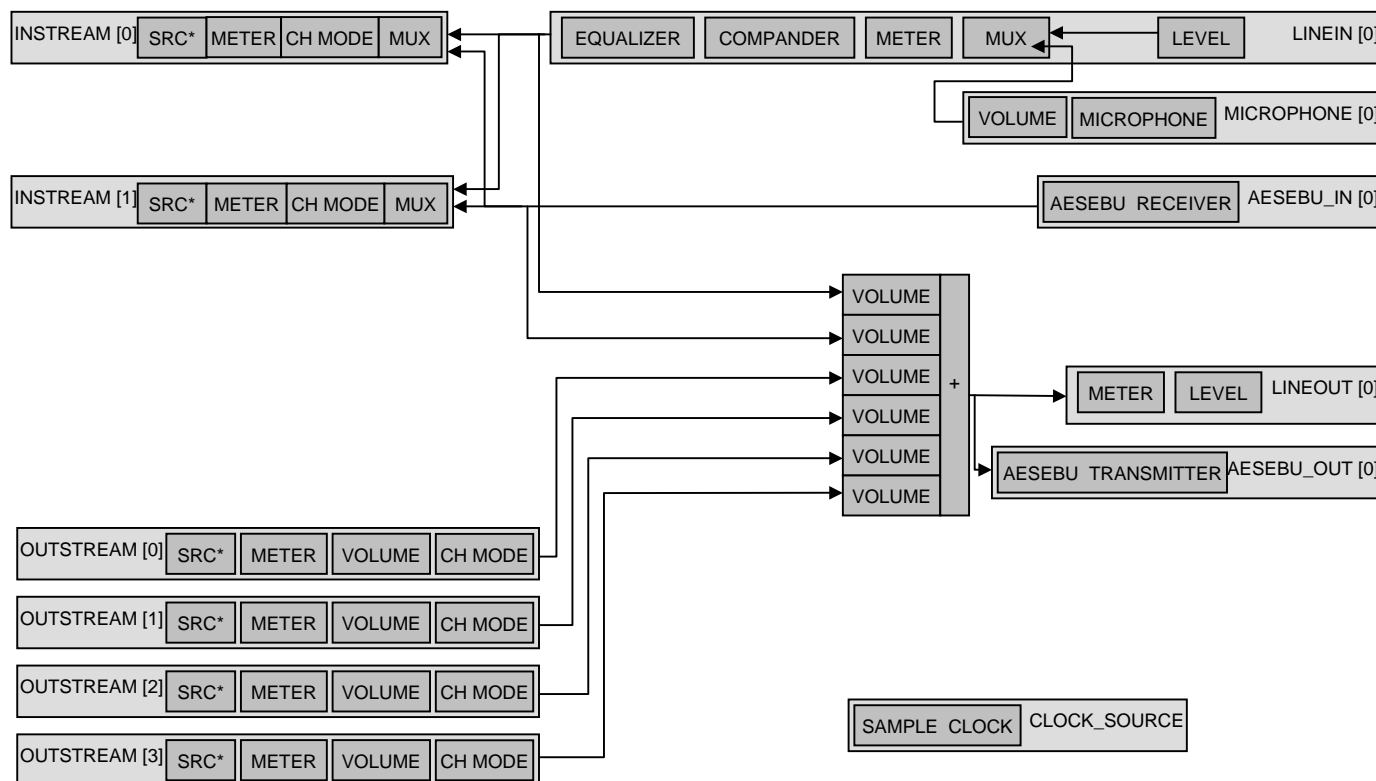


6 MIXER MAPS

6.1 HPI Mixer

The mixer layout for the ASI5111 as represented by the HPI is as follows. For details on each HPI control type, see the HPI specification (SPCHPI.PDF).

* SRC = Sample Rate Converter, not visible as an HPI object



7 AUDIO FORMATS

The ASI5111 supports record and play of the following formats:

Format	HPI format	Windows format
8 bit unsigned PCM	HPI_FORMAT_PCM8_UNSIGNED	WAVE_FORMAT_PCM, wBitsPerSample=8
16 bit signed PCM	HPI_FORMAT_PCM16_SIGNED	WAVE_FORMAT_PCM, wBitsPerSample=16
32 bit signed PCM	HPI_FORMAT_PCM32_SIGNED	WAVE_FORMAT_PCM, wBitsPerSample=32
32 bit floating point PCM (+/-1.0)	HPI_FORMAT_PCM32_FLOAT	WAVE_FORMAT_IEEE_FLOAT

8 MICROPHONE INPUT

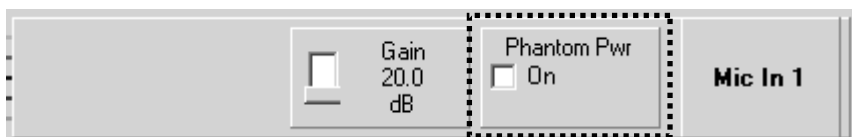
The ASI5111 has a balanced microphone input using a ¼" stereo jack.

8.1 Phantom Power

When phantom power is enabled, +48V is present on both the + and – signal inputs (tip and ring of ¼" jack). This is used to drive professional condenser type microphones. If you are using a dynamic microphone, make sure that the phantom power is off as it may damage the mic.

User

Phantom power is turned on and off using the following control in the ASI Mixer on the Microphone panel:



Developer

Windows – Phantom power is controlled using....

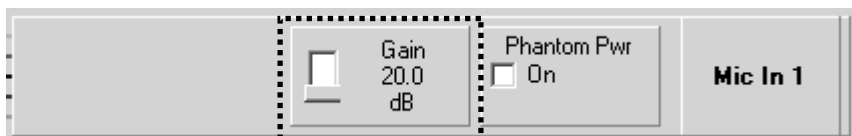
HPI – Phantom power is controlled using the HPI_Microphone_SetPhantomPower() API

8.2 Programmable Gain

The microphone preamp has a software programmable gain of +20, +40 or +60dB.

User

Microphone gain is adjusted using the following control in the ASI Mixer:



Developer

Windows – Microphone gain is controlled using....

HPI – Microphone is controlled using a Volume control on the MICROPHONE source node. Use HPI_VolumeSetGain() API.

9 BALANCED ANALOG I/O

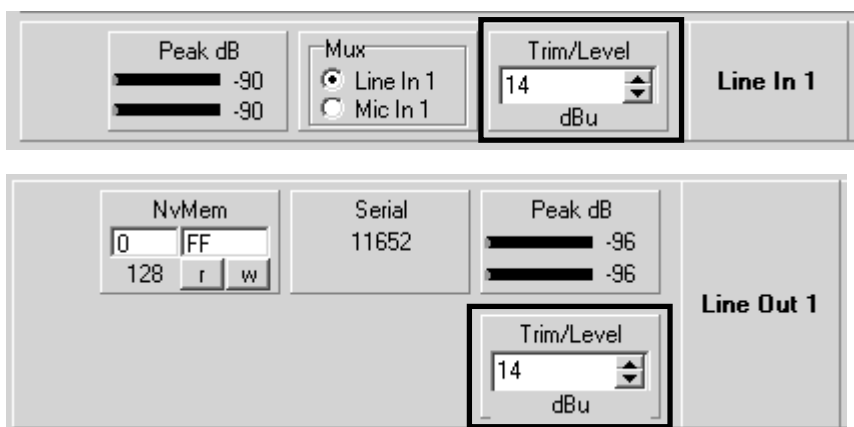
The ASI5111 has a stereo balanced analog input and output on a DB-9 female connector.

9.1 Analog I/O Level

The analog Level (or Trim) is software programmable independently for the input and output. It can be set from –10 to +20dBu in 1dB increments.

User

Analog levels are adjusted using the Trim/Level controls located on the LineIn and LineOut panels in the ASI Mixer:



Developer

Windows – Analog levels are controlled using....

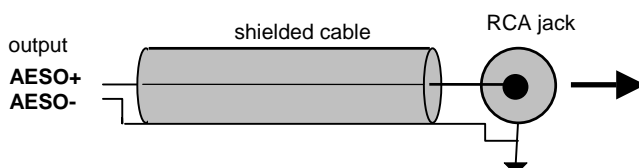
HPI – Analog levels controlled using the HPI_LevelSet() API

10 AES/EBU I/O

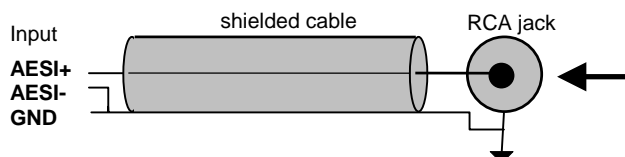
The ASI5111 has an AES/EBU digital audio input and output on a DB-9 male connector. This may also be operated as S/PDIF. The AES/EBU I/O operates at either 32, 44.1, 48, 64, 88.2 or 96kHz. The bitstream contains samples of 24bit precision. When a valid AES/EBU source is connected to the ASI5111, the card will automatically generate the sample clock from that source (see Sample Clock section)

10.1 Operating as S/PDIF

The AES/EBU I/O can be operated as S/PDIF (IEC958). When this happens, the impedance of the I/O changes to 75ohms and the signal level becomes ~0.5Vpp. As well as programming the correct settings in the card, the AES/EBU signals must be connected as follows. For S/PDIF output, connect the "-" side of the AES signal to the S/PDIF shield. The "+" side becomes the S/PDIF signal.

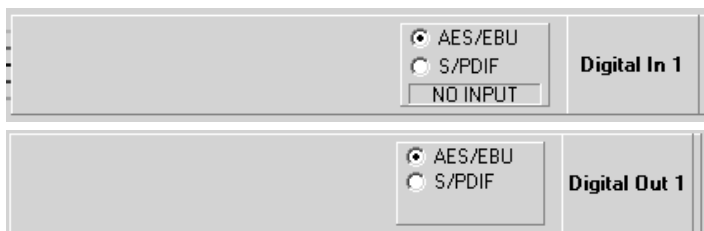


For S/PDIF input, connect the "-" side of the AES signal to the shield and ground. The "+" side becomes the signal.



User

Use the following controls in ASI Mixer to toggle between AES/EBU and S/PDIF



Developer

Windows – Use Digital I/O controls – see the “AudioScience WavX Specification” (SPCWAVX.PDF)

HPI – Use the HPI_AESEBU_Receiver_SetSource() and HPI_AESEBU_Transmitter_SetFormat() API

10.2 Channel Status and User Data

The ASI Mixer does not setup the Channel Status and User Data in the AES/EBU output. This must be done by the application using the following APIs:

Windows – Use Digital I/O controls – see the “AudioScience WavX Specification” (SPCWAVX.PDF)

HPI – Use HPI_AESEBU_Transmitter_SetChannelStatus() and HPI_AESEBU_Transmitter_SetUserData() APIs

Your application can also read the Channel Status and User Data of the AES/EBU input using the following APIs:

Windows – Use Digital I/O controls – see the “AudioScience WavX Specification” (SPCWAVX.PDF)

HPI – Use HPI_AESEBU_Receiver_GetChannelStatus() and HPI_AESEBU_Receiver_GetUserData() APIs

11 COMPANDER

The ASI5111 contains a compressor/expander (Compander), which is used to reduce or expand the dynamic range of the signal it acts on. It is located on the LineIn input and maybe used on both the Line In and Microphone signals.

User

The ASI5111's Compander is accessed from the ASI Mixer by clicking on the "Compander" button on the LineIn panel. The following parameters can be set:

Compression Threshold – the input signal level at which the compression starts.

Compression Ratio – The ratio of the input signal level to the output signal level

Makeup Gain – additional gain applied the compressed/expanded signal

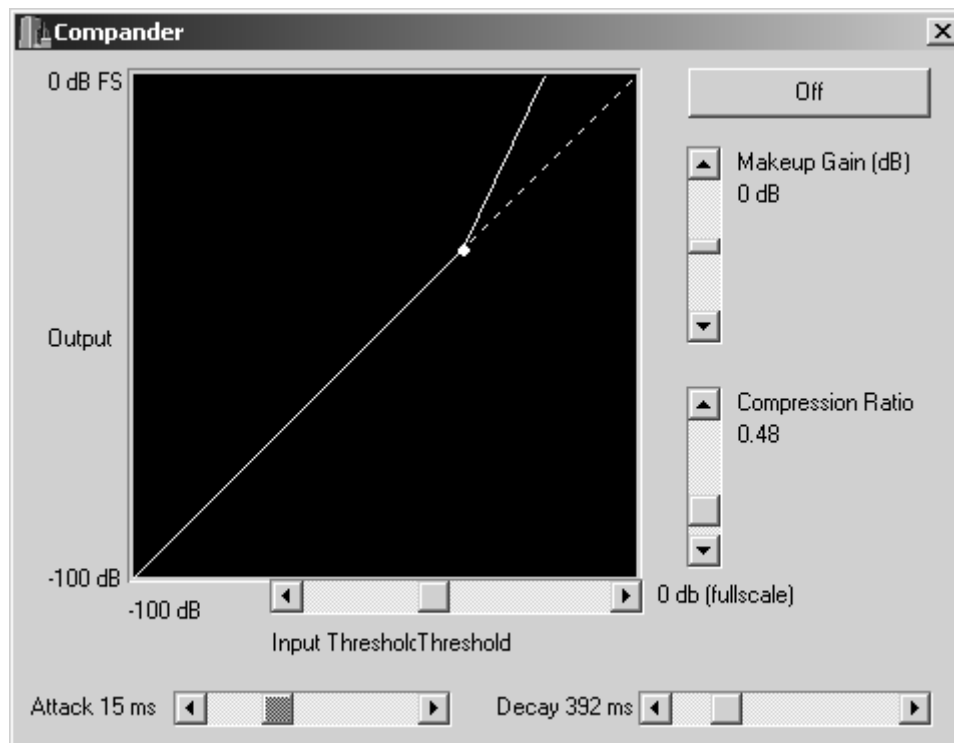
Attack - Attack time of compander in milliseconds. Sets the time that the compressor takes to act.

Decay - Decay time of compander in milliseconds. Sets the time for the signal gain to return to normal after compression.

Developer

Windows – Use the Compander control – see the "AudioScience WavX Specification" (SPCWAVX.PDF)

HPI – Use the HPI_Compandor_XXXX APIs - see the "AudioScience HPI Specification" (SPCHPI.PDF)



12 PARAMETRIC EQUALIZER

The ASI5111 contains a 5 band parametric equalizer. It is located on the LineIn input and maybe used on both the Line In and Microphone signals. Each of the equalizers 5 bands may be individually programmed with filter type (eq, low-pass, high-shelf etc), Q (sharpness) and center frequency.

User

The ASI5111's Parametric Equalizer is accessed from the ASI Mixer by clicking on the "EQ" button on the LineIn panel. The EQ window contains controls for setting the filter parameters of each of the 5 bands, with a graph showing the combined frequency response of the 5 bands.

Each filter band has the following parameters:

Filter Type – The shape of the filter. Can be Eq (default), Lowpass, Highpass, Bandpass, Lowshelf, Highshelf.

Filter Freq – The center frequency of the filter.

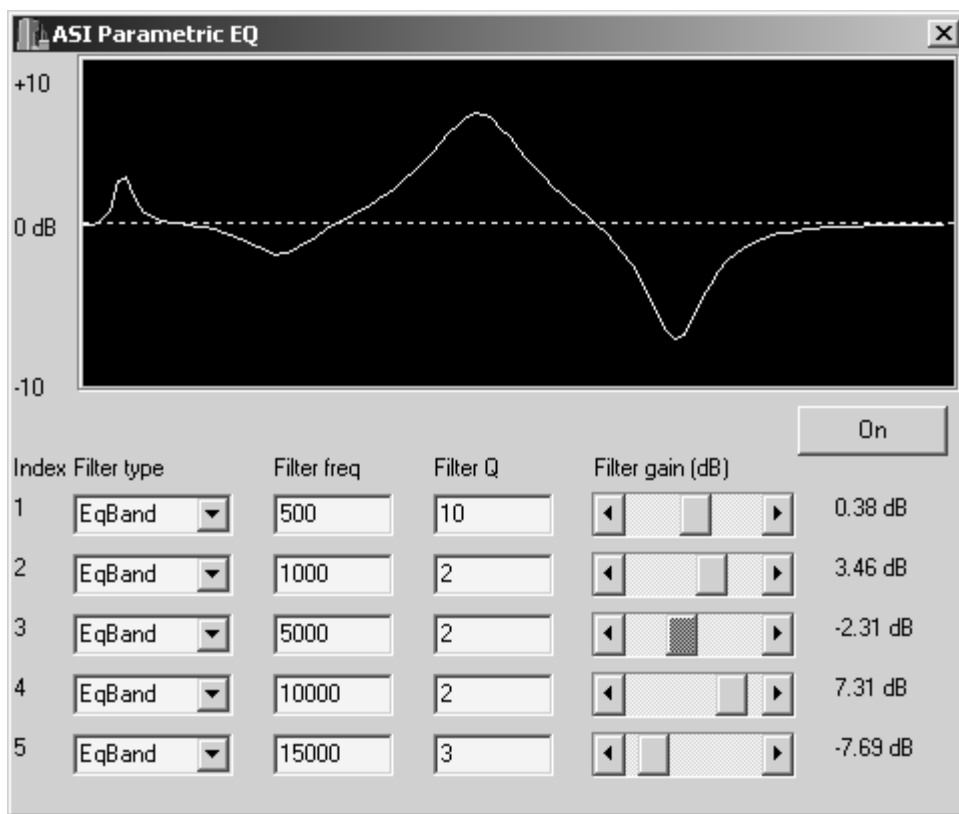
Filter Q – The sharpness of the filter. The higher the Q, the more selective the filter is.

Filter Gain – The gain of the filter at the center frequency.

Developer

Windows – Use the equalizer mixer control – see the "AudioScience WavX Specification" (SPCWAVX.PDF)

HPI – Use the HPI_ParametricEQ_XXXX APIs – see the "AudioScience HPI Specification" (SPCHPI.PDF)



13 SAMPLE RATE CLOCK and MRX MIXER

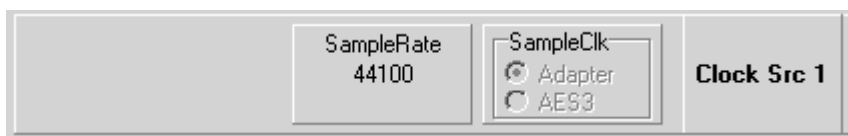
The ASI5111 sample rate clock is used to drive the MRX digital mixer, Analog to Digital Converter (ADC), Digital to Analog Converter (DAC) and AES/EBU output. There are two sources of sample rate clock – internal and the AES/EBU input.

The internal adapter clock is generated from a low jitter frequency synthesizer and may be set to 32, 44.1, 48, 64, 88.2 and 96kHz. When a valid AES/EBU bitstream is connected to the AES/EBU input, the ASI5111 will **automatically** switch to using this as the sample rate clock. This is needed so that digital audio from the AES/EBU input can be synchronized with the other audio streams present in the mixer. There is no way to override this.

Note that the sample rate clock does not determine the sample rates of the audio streams that may be played and recorded. These are independently set using the MRX multi rate mixer, so that, for instance, you can have the adapter running at 96kHz, but be playing files of 44.1 and 48kHz and recording files of 32 and 88.2kHz.

User

Use the following controls in ASI Mixer to select the internal adapter rate. Note the SampleClk source control is not user selectable as the adapter automatically switches depending whether a valid AES/EBU input is present.



Developer

Windows –

HPI – Use the HPI_SampleClock_XXXX APIs.

14 CABLES

The ASI5111 comes with XLR breakout cables for both the analog and digital connectors.

15 REFERENCES

Specifications

SPCWAVX.PDF - [WavX - AudioScience Windows Multimedia Extensions](#)

SPCHPI.PDF - [Hardware Programming Interface \(HPI\) Specification](#)

All these documents are available from www.audioscience.com in the Technical Info section

<end>

streaming

orban erl

audio processing

Optimod-PC 1101 - Local:10000001 - [Multiband]

File Edit View Tools Connect Help

Local:10000001 Active Preset: Modified GREGG OPEN

Input AGC <L R> HF Enhancer Gain Reduction <L R> Loudness GL Limiter Loudness RL Output

Connection List

All Connections

Local 10000001

Place cursor over the active:

13 + Clock IN

25 G Analog IN Left

12 - Analog IN Left

24 + Analog OUT Left

11 G Analog OUT Left

23 - Analog OUT Left

10 + Analog IN Right

22 G Analog IN Right

9 - Analog IN Right

21 + Analog OUT Right

8 G Analog OUT Right

20 - Analog OUT Right

7 + Digital OUT 2

19 G Digital OUT 2

6 - Digital OUT 2

18 + Digital IN 2

5 G Digital IN 2

17 - Digital IN 2

4 + Digital IN 1

16 G Digital IN 1

3 - Digital IN 1

15 + Digital OUT 1

2 G Digital OUT 1

14 - Digital OUT 1

1 + Clock IN

Optimod-PC 1101

Professional Audio Processor/Sound Card

orban

Optimod-PC 1101

From Orban, the most experienced provider
of broadcast audio processing for
AM, FM and television stations worldwide —

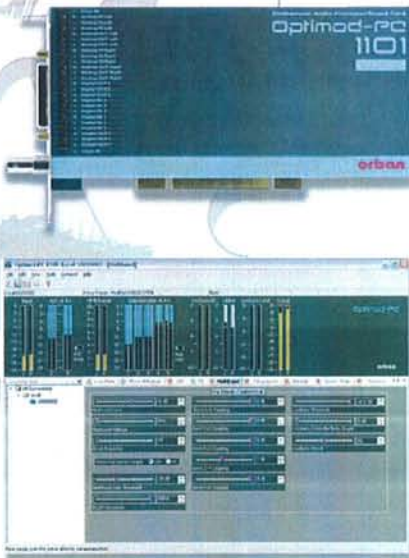
fully professional processing
on a PCI or PCIe sound card
for Windows computers



From the ground up, OPTIMOD-PC 1101 was designed for professionals. It has broadcast-quality digital signal processing on-board that's suitable for both live streaming and on-demand programming. OPTIMOD-PC's three on-board Freescale DSP56367 DSP chips provide a loud, consistent sound to the consumer by performing stereo enhancement, automatic gain control (AGC), equalization, multiband gain control, peak-level control and subjective loudness control. Moreover, OPTIMOD-PC supports AES3 digital connections and is equipped with balanced analog inputs and outputs that can operate at professional +4 dBu reference levels while resisting pickup of hum and noise.

OPTIMOD-PC is available in two versions — the 1101 is for PCI bus systems and the 1101e is for PCI Express. OPTIMOD-PC's audio driver allows it to appear as two standard sound devices to the computer's operating system. This allows netcasters who need to replace selected content (such as commercials in a program originally created for radio broadcast) to do so with only one sound card.

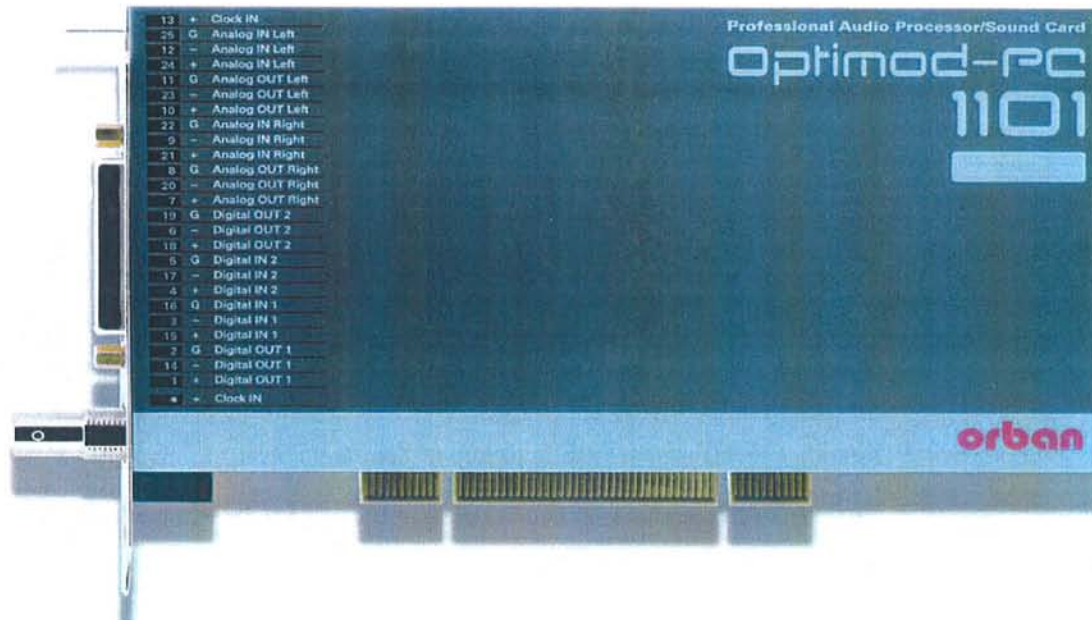
"Major-Market" processing for digital media and channels



OPTIMOD-PC audio processing is appropriate for all digital transmission media and channels. It tailors your audio signal to help you compete in audio netcasting, HD Radio® (both primary and multicast digital channels), DAB, DRM and other dedicated digital radio services, FMExtra™ and other digital subcarriers, mastering, audio production and many others. Additionally, video-oriented presets use OPTIMOD-PC's built-in CBS Loudness Controller™ to make OPTIMOD-PC an unsurpassed choice for mono or stereo sound-for-picture applications, including HDTV, DVB-x digital television and audio/video netcasting.

While primarily oriented toward "flat" media, OPTIMOD-PC can also provide pre-emphasis limiting for the two standard pre-emphasis curves of 50 μ s and 75 μ s. This allows it to protect pre-emphasized analog satellite uplinks and similar channels where protection limiting or light processing is required and makes it ideal for use as a studio AGC driving transmitter-located OPTIMODs.

Without OPTIMOD-PC processing, audio can sound dull, boring, thin or inconsistent in any combination. OPTIMOD-PC's multiband processing automatically levels and re-equalizes its input to the "major-market" standards expected by the mass audience. It also helps overcome background noise in mobile listening environments and helps you stand out from poorly processed streams.



Broadcasters have known for decades that this polished, produced sound attracts and holds listeners. Orban has long been the number one vendor of stand-alone transmission processing to professional broadcasters worldwide. Commercial broadcasters think nothing of spending upwards of \$10,000 to sculpt their audio with an OPTIMOD! Audio processing can help create an audio environment or mood. A broadcaster's revenue depends on audience share and broadcasters know that compromising their processing is false economy.

Professional radio broadcasters would never consider going on the air without audio signal processing. They consider it a vital aspect of their program content. This carefully crafted content is what holds listeners and keeps them coming back. Since 1975, OPTIMOD algorithms have dominated the world market for professional radio and television audio processing and have been improved continuously since then. OPTIMOD-PC puts this technology inside your computer.

There are many gain/peak control devices and software available to perform dynamics processing. Many of these tools are designed for recording studio applications as effects compressors/limiters for individual microphone or instrument tracks. These devices' controls need to be tuned carefully for the specific material being processed — they are not "set and forget" processors. Moreover, most do not process mixed program material without introducing objectionable audible artifacts, particularly when called upon to gain-ride input material having widely varying levels.

sculpt or tailor
audio
with

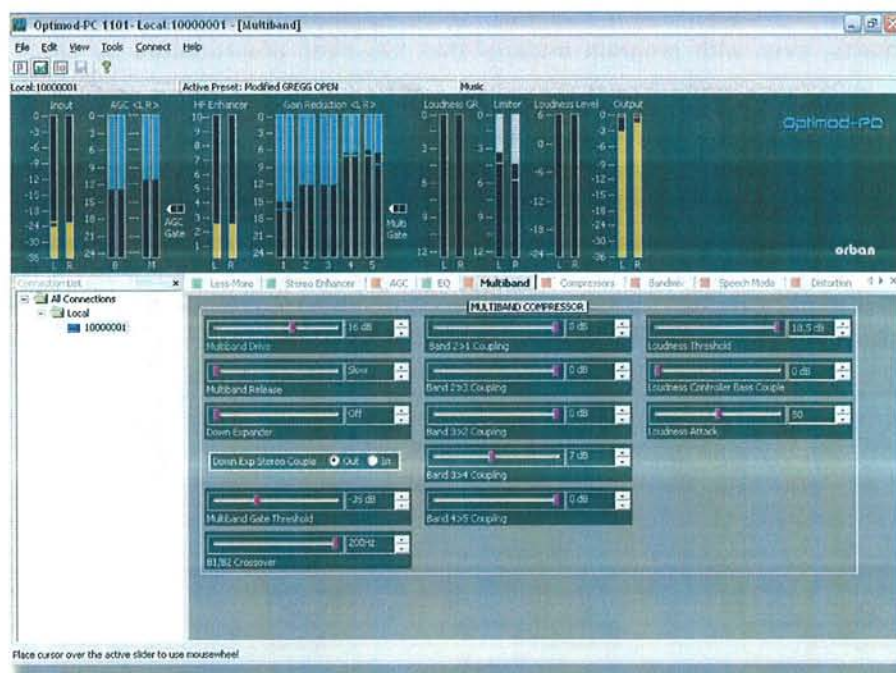


A broadcast audio processor should ideally be “seen, but not heard.” OPTIMOD processing algorithms simultaneously control audio gain and peaks, artistically, musically and naturally, to give the illusion that processing is not taking place. Moreover, OPTIMOD algorithms intelligently adapt themselves to the input program material. Once OPTIMOD-PC is tuned for the sound texture required for the broadcast or netcast format (which is made easy by OPTIMOD-PC’s many format-specific presets), it will provide excellent consistency regardless of the level or texture of the original program material. OPTIMOD-PC’s automatic gain control and equalization achieve a consistent sound, while accurate peak control maximizes loudness. Booming bass is tightened; weak, thin bass is brought up; highs are always present and consistent in level.

Thanks to OPTIMOD-PC, a netcaster who wants to maximize audience share no longer has to make do with toy processing, ineffective CPU-hungry plug-ins and inappropriate recording studio plug-ins. OPTIMOD-PC offers full broadcast-quality OPTIMOD processing on a card — an economical, space-saving alternative to conventional stand-alone boxes. But thanks to its tight integration into the PC, OPTIMOD-PC offers more features than any stand-alone processor. Among others, these include two digital inputs with mixing of asynchronous sources, two digital outputs, and sound card emulation that allows OPTIMOD-PC to talk through the operating system to applications running on the host.

full broadcast quality

maximizes audience share



To bring out the best in the low bit-rate codecs used in netcasting, you should preprocess an Internet audio signal to condition it prior to encoding. The appropriate preprocessing has much in common with the preprocessing required for DAB, HD Radio™, CD mastering or digital satellite. OPTICODEC-PC can provide this processing.

Conventional AM, FM or TV audio processors that employ pre-emphasis/de-emphasis and/or clipping peak limiters do not work well with perceptual audio coders such as Orban OPTICODEC-PC® MPEG-4 AAC/HE-AACv2 streaming encoder. The pre-emphasis/de-emphasis limiting in these processors unnecessarily limits high frequency headroom. Further, their clipping limiters create high frequency energy — distortion — that the perceptual audio coders have to encode, wasting bits. None of these devices has the full set of audio and control features found in OPTIMOD-PC.

Peak clipping sounds bad even in uncompressed digital channels because these channels do not rely on pre-emphasis/de-emphasis to reduce audible distortion. Instead of peak clipping, OPTIMOD-PC uses look-ahead limiting to protect the following channel from peak overload.

OPTIMOD-PC's PreCode™ technology manipulates several aspects of the audio to minimize artifacts caused by low bitrate codecs, ensuring consistent loudness and texture from one source to the next. PreCode includes special audio band detection algorithms that are energy and spectrum aware. This can improve codec performance on some codecs by reducing audio processing induced codec artifacts, even with program material that has been preprocessed by other processing than OPTIMOD. There are several factory presets tuned specifically for low performance, low bitrate codecs.

Unlike some other codec preprocessors, PreCode™ does not suck the punch and life out of music. Instead, PreCode™ strikes an artistic balance between liveliness and artifact reduction, ensuring that the cure is never worse than the disease.

PreCode™ brings out
the best in low-bitrate codecs

OPTIMOD-PC is also an excellent mastering processor, offering soft knee multiband compression with knee and ratio controls available separately for

PC

PC

PC

PC

PC

dual soundcard functionality
makes commercial insertion
easy

each band. OPTIMOD-PC's low-IM look-ahead limiter can typically achieve 12 dB of gain reduction before it produces objectionable artifacts — this limiter is exceptionally loud and clean.

Digital mixing is crucially important to a netcaster who needs to control commercial content and insertion. Unlike most sound cards, OPTIMOD-PC allows you to mix an analog source, two digital sources and two Wave sources. For example, you could run a playout system on your computer while using the three hardware inputs for a live microphone feed, commercial insert, and network insert. Or you could run the commercial insert playout software on the same computer as the main playout system, using OPTIMOD-PC's second Wave input to separately route the outputs of the two playout systems to the card. In most cases, an external mixer isn't needed, making OPTIMOD-PC a more economical system solution than a low-priced sound card combined with external hardware. OPTIMOD-PC is also perfect for podcast production.

For applications like commercial insertion, an API provides complete remote administration over TCP/IP and/or Serial. The OPTIMOD-PC Service application hosts a TCP/IP terminal server and a serial interface to allow external control of the OPTIMOD-PC cards from either a software Telnet/SSH terminal client, a custom third party application, or a hardware device such as a Broadcast Tools SRC-16. All OPTIMOD-PC Mixer and System Controls are accessible and all commands are simple text strings. You can adjust and monitor levels, tweak the processor's sound, save and recall presets, and more. Password security is provided.

OPTIMOD-PC comes with over 20 great-sounding presets that make it easy to create a sonic texture that's just right for your target audience. If you want to customize a preset, you can start with an easy LESS-MORE control. If that's not enough, tweak over 50 parameters to hone your sound to perfection. OPTIMOD-PC's deep interface will never hold you back as your processing expertise increases, yet its carefully crafted design insulates you from the details if you need great sound right now.

You can expect a considerable increase in loudness from OPTIMOD-PC processing by comparison to unprocessed audio (except for audio from recently mastered

PC PC PC PC PC

CDs, which are often overprocessed in mastering). Broadcasters generally believe that loudness relative to other stations attracts an audience that perceives the station as being more powerful than its competition. We believe that the same subliminal psychology holds in netcasting.

Figure 1-1 shows a 15-minute snapshot of program audio as it emerged from the on-air mixer of a major Los Angeles radio station. Source material included music, speech, and commercials. Notice the large inconsistency in peak and average level between one program source and the next. Figure 1-2 shows the same material after being processed through OPTIMOD-PC, using the Gregg preset. Notice that program levels are now consistent from source to source.

Figure 1-1: Unprocessed Audio

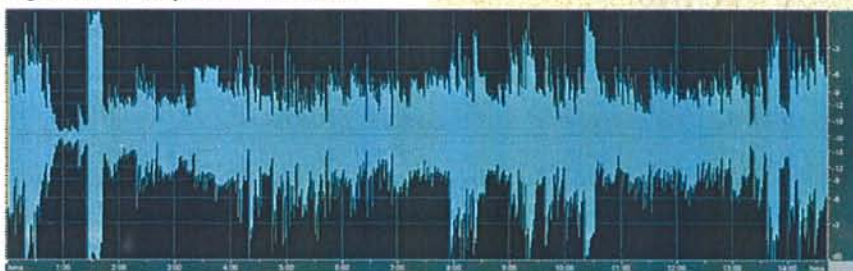
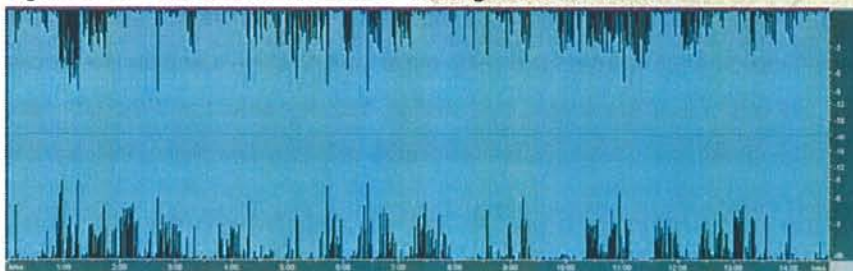


Figure 1-2: Same Audio Processed Through OPTIMOD-PC



It is important to understand that peak or average file normalization does not accomplish what OPTIMOD-PC processing can. Normalization applies a fixed loudness adjustment to the entire file — it's like setting a volume control once and only once. On the other hand, OPTIMOD-PC processing constantly adjusts spectral balance and loudness to achieve a consistency that brands your sound. This is particularly important during transitions from one program element to the next and is one of the key techniques that major-market radio stations use to achieve their polished, "produced" audio texture.

Make your audio all it can be and get this turbo-powered, economical processing solution today.

PC PC PC PC PC

features & benefits

GENERAL FEATURES

OPTIMOD-quality digital audio processing	On a PCI sound card that pre-processes audio for consistency and loudness before it is transmitted or recorded.
Available in two versions	1101 for PCI sockets and 1101e for PCIe (PCI Express) sockets.
Applications	include netcasting, HD Radio® (both primary and secondary digital channels), DAB and other dedicated digital radio services, FMExtra™ and other digital subcarriers, mastering, audio production and many others.
Supplied WAVE drivers	Allow OPTIMOD-PC's processed output to pass through the PCI bus to the CPU, driving standard PC applications like Orban's OPTIMOD-PC MPEG-4 HE-AAC, as well as as well as Microsoft or Real streaming encoders. OPTIMOD-PC's audio driver allows it to appear as two sound devices to the computer's operating system. The driver (with the aid of concurrently running third-party software) also allows OPTIMOD-PC to receive audio over IP from the host computer's network connection. Drivers are available for 32 and 64-bit Windows XP, 32 and 64-bit Windows Vista, and 32 and 64-bit Windows 7.
Orban PreCode™ technology	Manipulates several aspects of the audio to minimize artifacts caused by low bitrate codecs, ensuring consistent loudness and texture from one source to the next. PreCode includes special audio band detection algorithms that are energy and spectrum aware. This can improve codec performance on some codecs by reducing audio processing induced codec artifacts, even with program material that has been preprocessed by other processing than OPTIMOD.
Two-Band automatic gain control	With window gating and selectable L/R or sum/difference processing; compensates for widely varying input levels.
Bass equalizer and parametric equalizer	Shelving bass equalizer and three-band parametric equalizer let you color the audio to your exact requirements.
Low-IM look-ahead limiter	Effectively limits peaks while ensuring that low-bit-rate codecs operate optimally without overload.
Precisely controls peak levels	To prevent overmodulation or codec overload. The peak limiter can be set up to control "flat" transmission channels or channels pre-emphasized at 50 µs or 75 µs.
Pre-emphasis limiting	While primarily oriented toward "flat" media , OPTIMOD-PC can also provide pre-emphasis limiting for the two standard pre-emphasis curves of 50 µs and 75 µs. This allows it to protect pre-emphasized satellite uplinks and similar channels where protection limiting or light processing is required. Because analog television FM aural carriers are lightly processed, OPTIMOD-PC can also be used to process these. <i>Because its processing topology is most effective with "flat media", OPTIMOD-PC cannot provide extreme loudness for pre-emphasized radio channels. Use one of Orban's OPTIMOD-FM processors for this application.</i>
Dual-mono architecture	OPTIMOD-PC's dual-mono architecture allows entirely separate mono programs to be processed in 5-band mode, facilitating dual-language operation. In mono mode, each channel has its own CBS Loudness Controller and Loudness Meter. <i>In this mode, both processing channels operate using the same processing parameters (like release time); you cannot adjust the two channels to provide different processing textures.</i>
Balanced analog input	With 24-bit A/D converter is always active, mixing with the two digital inputs.
Balanced analog monitor output	With 24-bit D/A converter.
Two AES3 or S/PDIF digital inputs	With high-quality sample rate conversion to allow two asynchronous digital sources to be mixed: Ideal for network operations using local commercial/announcement insertion.
The second digital input	also accepts AES3 house sync, synchronizing the AES3 output sample rate to the sample rate of the sync input.
Accepts sample rate from 32 to 96 kHz	Digital inputs accept any sample rate from 32 to 96 kHz without manual configuration.

features & benefits

GENERAL FEATURES (continued)

Two AES3 digital outputs	At 32, 44.1, 48, 88.2 or 96 kHz sample rate.
Two Wave inputs	from any PC audio application (like a playout system) that can emit standard Wave audio. Audio from the Wave inputs can be mixed and switched with OPTIMOD-PC's hardware inputs. Because there are two inputs, you can operate two PC applications simultaneously and mix and/or switch their Wave outputs inside OPTIMOD-PC, such as content/commercial insertion systems.
Internal processing	Occurs at 48 kHz sample rate and 20 kHz audio bandwidth.
Full PCI bus-mastering	Minimizes load on the host computer's memory and CPU.
I/O Mixer application	Permits versatile routing and switching of processed and unprocessed audio from and to OPTIMOD-PC's inputs and outputs, and to and from the host computer's WAVE audio.
Terminal Control API	For network or localhost control and automation of all I/O Mixer functions and Preset switching. Status is broadcast to all active clients.
Serial Control API	Allows OPTIMOD-PC to be controlled either by ASCII serial commands or by a serial-to-contact-closure device such as a Broadcast Tools SRC-16.
MS Windows Mixer API	Support in parallel to the existing Orban Mixer allows standard Microsoft Windows audio applications to control OPTIMOD PC's inputs and outputs.
MS Windows Metering API	Windows applications using this API will display audio levels. (Many broadcast playout systems use this.)
Freescale DSPs	DSP chips do all the audio processing — there is no extra DSP load on your computer's CPU, freeing more CPU cycles for encoding bit-reduced audio.
Full coprocessing	Coprocessing independent of the host computer's CPU means that audio will ordinarily continue to pass through the card from its hardware inputs to its hardware outputs during a host computer soft reboot or crash. (Of course, Wave inputs and outputs will stop working because these are dependent on operating system services.)
Twenty standard presets	OPTIMOD-PC ships with over twenty standard presets , which correspond to different programming formats. These presets have already been tested and field-proven in major-market radio netcasting, digital radio, and direct satellite broadcasting applications (both radio and television) worldwide. There are also special-purpose presets for mastering, studio AGC, pure peak limiting and low bitrate encoding applications.
An easy-to-use graphic control application	Runs on your PC and can act as a client to control any number of OPTIMOD-PC cards, either locally or in other PCs on your network via TCP/IP. The Orban software offers a server function, allowing other computers on your network to address cards located in your PC. (This server software is installed automatically as part of the OPTIMOD-PC installation process and runs as a Windows Service.)
Custom presets	The Control application allows you complete flexibility to create your own custom presets , to save as many as you want to your local hard drive and to recall them at will.
Orban ClockLock™ technology	ClockLock™ locks the 1101's output sample rate to an external 10 MHz, word clock, or AES3/AES11 reference. Both AES3 outputs and WAV output can be locked, which prevents buffer underflows and overflows in downstream software and hardware. ClockLock uses a phase-locked loop with crystal VFO to ensure low jitter and will lock to 32, 44.1, 48, 88.2 and 96 kHz samplersates.
ADAPTABILITY THROUGH MULTIPLE AUDIO PROCESSING STRUCTURES	
Multiple processing structures	A processing structure is a program that operates as a complete audio processing system. Only one processing structure can be active at a time. Just as there are many possible ways of configuring a processing system using analog components (such as equalizers, compressors, limiters and clippers), there are several possible processing structures achievable by OPTIMOD-PC. OPTIMOD-PC realizes its processing structures as a series of high-speed mathematical computations made by Digital Signal Processing (DSP) chips.
Five-Band and Two-Band processing structures	OPTIMOD-PC features two processing structures: Five-Band (or Multiband) for a consistent, "processed" sound, free from undesirable side effects and Two-Band for a tastefully controlled sound that preserves the frequency balance of the original program material.

features & benefits

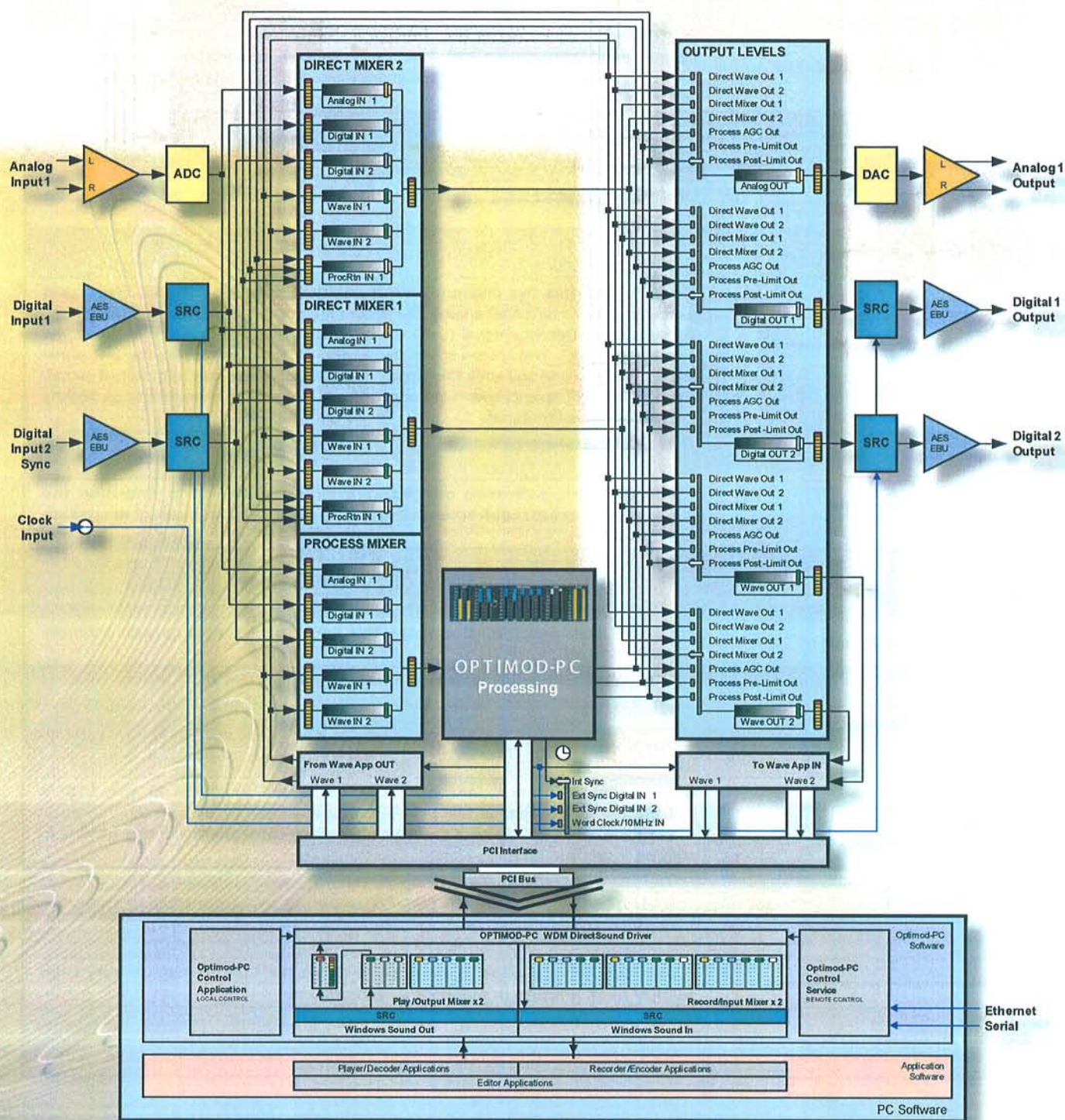
ADAPTABILITY THROUGH MULTIPLE AUDIO PROCESSING STRUCTURES *(continued)*

Protection Limiter	The Two-Band structure can also be tuned to operate as a Protection Limiter , providing up to 25 dB of safety limiting with minimal side effects.
Increased density and loudness	OPTIMOD-PC can increase the density and loudness of the program material by multiband compression and look-ahead limiting, remarkably improving sonic consistency while increasing loudness and definition, all without producing unpleasant side effects.
Smooth automatic gain riding	OPTIMOD-PC rides gain over an adjustable range of up to 25 dB, compressing dynamic range and compensating for operator gain-riding errors and for gain inconsistencies in automated systems.
Phase-linear processing structures	OPTIMOD-PC's processing structures are all phase-linear to maximize audible transparency.
Change by smooth cross-fade	OPTIMOD-PC can be changed from one processing structure to another with a smooth cross-fade .
Two styles of stereo enhancement algorithms	The 1101 provides two different stereo enhancement algorithms . The first is based on Orban's patented analog 222 Stereo Enhancer, which increases the energy in the stereo difference signal (L-R) whenever a transient is detected in the stereo sum signal (L+R). The second stereo enhancement algorithm passes the L-R signal through a delay line and adds this decorrelated signal to the unenhanced L-R signal. Gating circuitry prevents over-enhancement and undesired enhancement on slightly unbalanced mono material.
Two-Band automatic gain control	Two-Band automatic gain control with window gating and selectable L/R or sum/difference processing compensates for widely varying input levels.
Two-band and five-band compressors	With parametric soft-knee compression curves allow you to fine-tune the audio to your exact requirements and make OPTIMOD-PC an excellent mastering processor .
Low-delay monitoring path for talent headphones	The output of the two-band or five-band compressor can be routed directly to the card's outputs, bypassing the delay in the look-ahead limiter and facilitating creation of a low-delay monitoring path for talent headphones .
Low-IM look-ahead limiter	Effectively limits peaks while ensuring that low-bit-rate codecs operate optimally without overload.
CBS Loudness Controller™	Limits subjective loudness to a preset threshold , making the 1101 an ideal processor in sound-for-picture applications by taming loud commercials before they annoy and alienate the audience. The Loudness Controller uses the 1981 Jones & Torick algorithm developed at CBS Technology Center and further refined by Orban.
Two independent loudness controllers and two loudness meters	CBS Loudness Meter™ measures the subjective loudness of the 1101's output and is displayed in the 1101's control application meter window. In dual-mono mode, there are two independent loudness controllers and two loudness meters available.
Transparently supports Dolby Digital® dialnorm metadata	If you tell the 1101 the dialnorm value you are sending to Dolby Digital receivers and use a "TV" processing preset, your transmission will automatically have the same loudness as other properly aligned Dolby Digital sources. This makes the 1101 an excellent choice to process ATSC subchannels.
Very high quality peak limiting	A pure peak limiting preset is available. It allows the 1101 to perform very high quality peak limiting in mastering applications .
AGC functionality	OPTIMOD-PC can be used as for automatic gain control, AGC (including peak limiting) to protect a studio-to-transmitter link (STL), optimally using the STL's native dynamic range.

versatility

for sound-for-picture or audio-only applications

Operational Block Diagram



It is impossible to characterize the listening quality of even the simplest limiter or compressor based on specifications because such specifications cannot adequately describe the crucial dynamic processes that occur under program conditions. Therefore, the only way to evaluate the sound of an audio processor meaningfully is by subjective listening tests.



Certain specifications are presented here to assure the engineer that they are reasonable, to help plan the installation, and to facilitate making certain comparisons with other processing equipment.

System	
Number of Audio Processors	One stereo or two independent mono audio processors, each consisting of the following cascaded processing elements: Internal Processing: Input → Stereo Enhancer → Two-Band defeatable AGC with window gating → Five-Band Equalizer/HF Enhancer → Multiband Compressor → Look-ahead Limiter → Automatic Loudness Controller → Output.
Number of Channels	The 1101 audio driver allows it to appear as two standard sound devices to the computer operating system. Each of the two sound devices can handle one stereo channel or two mono channels. The channels can be mixed and routed via a three-bus mixer ("Processed", "Direct 1" and "Direct 2"); however the 1101 can only apply stereo or dual-mono audio processing to the output of the "Processed" bus. The remaining two "Direct" busses are applied to the Output Routing Switcher but cannot be further processed. See block diagram.
Frequency Response (Bypass software running)	±0.1 dB, 2 – 20,000 Hz.
Input/Output Delay	Adjustable from 25 ms to 62 ms in 1 ms steps. Presets available for one frame of: 30 fps (33.33 ms), 29.97 fps (NTSC color video; 33.37 ms), 25 fps (most PAL video; 40 ms) and 24 fps (film; 41.67 ms). "Minimum" delay is also available; this delay will vary according to the processing structure in use and crossover mode settings.
Internal Filters	10, 11, 12, 13, 14, 15 and 20 kHz can be used to provide additional anti-aliasing for low sample rate services, such as Internet Streaming Encoders, Eureka-147 (24 kHz mode), iBiquity® HD AM™ (IBOC) (32 kHz) and Digital Radio Mondiale.
Internal Sample Rate	48 kHz.
Wave Sample Rate	8 – 96 kHz.
Internal Resolution	24-bit fixed point (3 x 150 MHz Freescale DSP56367).
Input/Output Resolution	24-bit.
Peak Control Accuracy	If output samples are synchronous with internal samples, maximum overshoot of any output sample is 0.1 dB. This is true at 48 kHz output sample rate. If sample rate conversion after internal processing makes output samples asynchronous with internal samples, output samples can overshoot as much as 1dB (0.3 dB typical).
Phase Response	All dynamics processing is linear-phase (constant group delay). Equalizers are minimum-phase.
AGC (Automatic Gain Control)	±12 dB / 24 dB gain range, Two-Band, Gate and Window enabled.
Stereo Enhancer	Two styles available: (1) Orban-patented L-R dynamic expansion triggered by L+R transients; (2) L-R delay.
Multiband Compressors	-24 dB gain range, Five-Band and Two-Band, selectable by mute-free crossfade.
Equalizers	Shelving Low Bass EQ, selectable 6 dB, 12 dB or 18 dB/octave. Three-band Parametric EQ with analog-style bell-shaped curves. Program Adaptive HF Enhancer.
Limiter	-12 dB gain reduction range; Look-ahead; IM distortion reduced; competitive with the best dedicated mastering limiters; achieves high loudness with a remarkable lack of side-effects
Loudness Controller	Constrains subjective loudness to a user-adjustable threshold via the 1981 Jones & Torick CBS Technology Center algorithm as further refined and developed by Orban. The algorithm also drives a subjective loudness meter, which is displayed on the 1101's GUI. In dual-mono mode, there are two independent loudness controllers and meters.
Number of Factory Presets	More than 20, each with 19-step LESS-MORE control. Presets are fully customizable with FULL CONTROL. In addition to presets for full processing, there are also "AGC", "Look-ahead Limiter" and "mastering" presets. There are also presets for analog television that uses an FM aural carrier.
Number of User Presets	Essentially unlimited. User presets can be saved on the host hard drive or on other storage devices.
Wave Audio Input	
Number of Inputs	Two.
Configuration	Stereo.
Sound Devices	Two.
Driver	Multi-client Driver allows 1101 to appear as two standard sound devices to the computer operating system. The input can therefore be received from multiple software applications running on the host computer system by use of standard operating system sound device driver calls. For example, this could include single or multiple player applications, such as an audio playout system with multiple players, content insertion system, or audio over IP routed into the host computer through an Ethernet port, and/or multiple streaming audio encoders. Because the driver is multi-client, it allows it to source multiple applications simultaneously. A versatile mixer and router application allows you to mix digital, analog, and wave inputs to three busses (one with OPTIMOD-PC processing and two without) and to route the outputs of the "Processed" and "Direct" busses to the Analog, Digital, and Wave Outputs in any configuration or combination, such that any output can receive any bus or the unprocessed Wave Input. Content insertion systems that would normally require two sound devices can be configured to work with one 1101 OPTIMOD-PC, requiring only one PCI or PCIe slot per program source.
Sample Rate	8 – 96 kHz. Asynchronously Sample Rate Converted by Driver.
Sync	Internal free running or External. Either AES/EBU, Word Clock, or 10 MHz input can be used as source for external sync. Wave data will be clocked to software-configurable Internal or External sources.
Input Level	Variable within the range of -20 to 0 dBFS (Peak) in 0.5 dB steps. Software-adjustable via OPTIMOD-PC Mixer Application and Windows Mixer API.

specifications

SPECIFICATIONS

Wave Audio Output	
Number of Outputs	Two.
Configuration	Stereo.
Sound Devices	Two.
Driver	Multi-client Driver allows 1101 to appear as two standard sound devices to the computer operating system. The output can therefore be routed to multiple software applications simultaneously, such as audio encoders, recorders, and content insertion systems running on the host system, and/or the card physical outputs via the Mixer Application. Software applications running on the host system do not require the use of physical cables to connect Wave Inputs and Outputs to applications, eliminating any unnecessary digital sample rate conversion. Content insertion systems that would normally require two sound devices can be configured to work with one 1101 OPTIMOD-PC, requiring only one PCI or PCIe slot per program source.
Sample Rate	Internal free running at 32 kHz, 44.1 kHz, 48 kHz, selected in software. External Sync to either AES/EBU or Word Clock Input at 32 kHz, 44.1 kHz, 48 kHz, 88.1 kHz, 96 kHz or 10 MHz, all $\pm 0.05\%$.
Sync	Internal free running or external. Either AES/EBU, Word Clock or 10 MHz input can be used as source for external sync. AES/EBU and Word Clock input must be 32, 44.1, 48, 88.1 or 96 kHz, $\pm 0.05\%$. Wave data will be clocked to software-configurable Internal or External sources.
Jitter	Less than 10 ns rms.
Output Level Control	Peak level is adjustable from -20 to 0 dBFS in 0.1 dB steps. Software-adjustable via OPTIMOD-PC Mixer Application and Windows Mixer API.
Analog Audio Input	
Number of Inputs	One pair.
Configuration	Stereo.
Impedance	>10 k Ω impedance, electronically balanced, floating and symmetrical.
Nominal Input Level	-10 dBu / +4 dBu VU, -2 dBu / +21 dBu PPM. Software-adjustable via OPTIMOD-PC Mixer Application and Windows Mixer API.
Maximum Input Level	+20 dBu, peak.
Reference Level	-20 dBFS. -10 dBu / +4 dBu VU Input Level produces -20 dBFS when Input Level fader is 0 dB.
A/D Conversion	24-bit 128X oversampled delta sigma A/D converter with linear phase anti-aliasing filter.
Audio Connector	DB-25, EMI suppressed.
Analog Audio Output	
<i>Note that this output is primarily for monitoring. Nevertheless, it has been designed for low noise, distortion, and overshoot and can drive an STL or transmitter in an analog facility. Peak control will not be as good as at the digital output because transmitted samples will be asynchronous with peak-controlled internal samples. Like the other OPTIMOD-PC outputs, the source of this output can be switched between the computer's WAVE output, the output of OPTIMOD-PC's Direct Mixer, OPTIMOD-PC's peak limiter output and OPTIMOD-PC's multiband compressor output. Because most of the delay occurs in the peak limiter, using the multiband compressor output can make headphone monitoring much more comfortable for live talent when live microphone inputs are used.</i>	
Number of Outputs	One pair.
Configuration	Stereo.
Source Impedance	50 Ω , electronically balanced and floating.
Load Impedance	600 Ω or greater, balanced or unbalanced. Termination not required or recommended.
Output Level	+4 dBu nominal; Clip level +18 dBu unbalanced, +24 dBu balanced. Software-adjustable via OPTIMOD-PC Mixer Application and Windows Mixer API.
Signal-to-Noise	96 dB unweighted signal-to-noise re +24 dBu, 20 Hz - 20 kHz (bypass mode).
Distortion	<0.01% THD (bypass mode), 20 Hz - 20 kHz. (Note: To prevent out-of-band noise caused by noise shaping from causing falsely high noise readings, noise and distortion specifications must be verified by a bandpass filter having a very sharp cutoff at 20 kHz.)
D/A Conversion	24-bit 128X oversampled D/A with linear phase anti-imaging filter.
DC Offset	Less than 10 mV differential offset.
Highpass Filter	-3 dB 2.0 Hz.
Audio Connector	DB-25, EMI suppressed.
Digital Audio Input	
Number of Inputs	Two, each with Sample-Rate Converter. The two inputs can accept asynchronous inputs and these can be mixed. One of the inputs can also be configured as sync reference to lock output sample rate to the sample rate at this input.
Configuration	Stereo AES/EBU (AES3-1992/AES18) or S/PDIF, 24-bits resolution; software selection of stereo, mono from left, mono from right, or mono from sum (as source to use as a mono processor).
User Bits	AES18 compliant. Incoming User Bits will pass through to Digital Output. User Bits can also be inserted or extracted via Serial or Ethernet using OPTIMOD-PC Control Application.
Impedance	Transformer balanced and floating, 110 Ω impedance, AES/EBU.
Sample Rate	20 - 96 kHz.
Input Level	Variable within the range of -20 to 0 dBFS (Peak) in 0.5 dB steps. Software-adjustable via OPTIMOD-PC Mixer Application and Windows Mixer API.
Internal Input	See 'Wave Audio Input' above.
Audio Connector	DB-25, EMI suppressed.
Word Clock	DB-25, EMI Suppressed and/or BNC; input accepts 1x word clock at 32, 44.1, 48, 88.2 and 96 kHz or 10 MHz sine or squarewave.
Digital Audio Output	
Number of Outputs	Two.
Configuration	Two-channel per AES/EBU-standard (AES3-1992) or S/PDIF (consumer) standard, software selectable.
Output Level Control	Peak level is adjustable from -20 to 0 dBFS in 0.1 dB steps. Software-adjustable via OPTIMOD-PC Mixer Application and Windows Mixer API.

SPECIFICATIONS

SPECIFICATIONS

SPECIFICATIONS

Digital Audio Output (continued)

Sample Rate	Internal free running at 32, 44.1, 48, 88.1 or 96 kHz, selected in software. Can also be synced to either AES/EBU input at 32, 44.1, 48, 88.1 or 96 kHz, all $\pm 0.05\%$.
Word Length	Selectable 24, 20, 18 or 16-bit. Optional dither can be added, with level adjusted appropriate to word length. This is first-order noise-shaped dither. (i.e., white TPDF dither of peak amplitude equal to the quantizer step size with noise shaping spectral density of 6 dB/octave.) It sounds substantially quieter than white triangular PDF dither but, in contrast to more extreme noise-shaped dither, it adds only 3 dB unweighted noise by comparison to white PDF dither.
Sync	Internal free running or external. Either AES/EBU, Word Clock or 10 MHz input can be used as source for external sync. AES/EBU and Word Clock input must be 32, 44.1, 48, 88.1 or 96 kHz, $\pm 0.05\%$
Frequency Response	DC - 20,000 Hz ± 0.1 dB (Digital I/O).
Signal-to-Noise	100 dB (referenced to -20 dBFS Lineup Level) (Digital I/O).
Dynamic Range	120 dB (bypass mode) (Digital I/O).
THD+N	0.0006 %, 1 kHz, -1 dBFS (bypass mode) (Digital I/O).
Crosstalk	Infinite (Digital I/O).
Internal Output	See 'Wave Audio Output'.
Audio Connector	DB-25, EMI suppressed.

Audio Cable Assembly

	DB-25 plug-in 6' / 1.8 m I/O cable assembly, terminated in XLR connectors.
Optional	Audio Inputs are XLR Female, Audio Outputs are XLR Male, Clock Input is BNC Female. Some applications will not require the use of external audio I/O, and therefore do not require a cable. Cable wiring is Tascam compatible.

Power

PCI Connector	+3.3 V at 1.1 A, +12 V at 260 mA maximum.
PCIe Connector	+3.3 V at 1.3 A, +12 V at 260 mA maximum.

Computer

Minimum System Requirements	Minimum System Requirements: Recommend Intel CPU and Chipsets. Microsoft Windows 2000 - Intel Pentium IV 800 MHz RAM 64 MB, 128 MB recommended. Microsoft Windows XP - Intel Pentium IV 1.0 GHz, RAM 128 MB, 256 MB recommended. Microsoft Windows Vista - Intel Pentium IV 1.0 GHz, RAM 512 MB, 1024 MB recommended. This provides the minimum recommended CPU power to control an arbitrary number of OPTIMOD-PC cards with external audio sources. Audio player and/or encoding software will require additional CPU power.
Bus	PCI Version 2.2 compliant; 32-bit; 33 MHz; transfer rate up to 132 MB/s. Will operate in 3.3 V or 5 V PCI slot and bus extenders. PCI-X 2.0 compliant. Plug and Play supported. PCIe: PCIe 1x Version 1.1 compliant. 250/500 MB/s. Plug and Play supported.
Audio Drivers	Microsoft Windows 2000/XP: WDM Audio DirectSound; multi-client; bus-mastering. 32/64-bit. Microsoft Windows Vista: WDM Audio; DirectSound; multi-client; bus-mastering 32/64-bit. Microsoft Windows 7: WDM Audio; DirectSound; multi-client; bus-mastering 32/64-bit. Mixer application provides complete control of digital mixer and all hardware settings.
Software	The control application provides subjective adjustment controls of the audio processing and remote administration. It also allows factory and user presets to be recalled from and save to a host storage device such as a hard disk drive or removable drive. The control application client addresses multiple OPTIMOD-PC cards, either housed in the local host or anywhere on a TCP/IP network or by local serial communication. The control application also functions as a server, interfacing cards installed in a given host computer with the network for control and monitoring. Microsoft Windows Mixer Control API is supported for Input and Output switching and levels. This provides compatibility with Windows applications that use standard Microsoft Windows Mixer calls and enumeration.
API	The IP API provides complete remote administration over TCP/IP. The OPTIMOD-PC Service application hosts a TCP/IP Terminal Server to allow external control of the OPTIMOD-PC cards from either a Telnet/SSH client or a custom third party application. All OPTIMOD-PC Presets and Mixer Controls are accessible and all commands are simple text strings. Telnet/SSH: RFC 318 compliant basic subset. Compatible with Windows Telnet and PuTTY Telnet clients. TCP/IP Port user assignable. The Serial API provides complete remote administration over serial port communication. The OPTIMOD-PC Service application hosts a serial terminal server to allow external control of OPTIMOD-PC cards from either a terminal client or a custom third party application. All OPTIMOD-PC Presets and Mixer Controls are accessible and all commands are simple text strings. Compatible with terminal programs such as Windows HyperTerminal and PuTTY VT-100 clients. COM Port user assignable from COM1 to COM100.
Status Monitoring	SNMP RFC 1157 compliant. Monitors all Audio Input and Output presence, Mixer Control status, Active Preset, Control Application Connections and Control Client Connections.
Regulatory	
Certifications	CE and FCC Class B, RoHS compliant.
Environmental	
Operating Temperature	32 to 122 °F / 0 to 50 °C for all operating voltage ranges.
Humidity	0 - 95% RH, non-condensing.
Size	PCI Standard Full Height / Short Length (L x H x W): 6.6" x 4.2" x 0.75" - 168 mm x 107 mm x 19 mm. 4 lbs. / 1.8 kg with cable assembly.
Shipping Weight	2.0 lbs. / 1.0 kg 1101 OPTIMOD-PC Card. 2.0 lbs. / 1.0 kg 1101 Cable Assembly.

Because engineering improvements are ongoing, specifications are subject to change without notice.



www.orban.com

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ORBAN Northern California Design Center Group

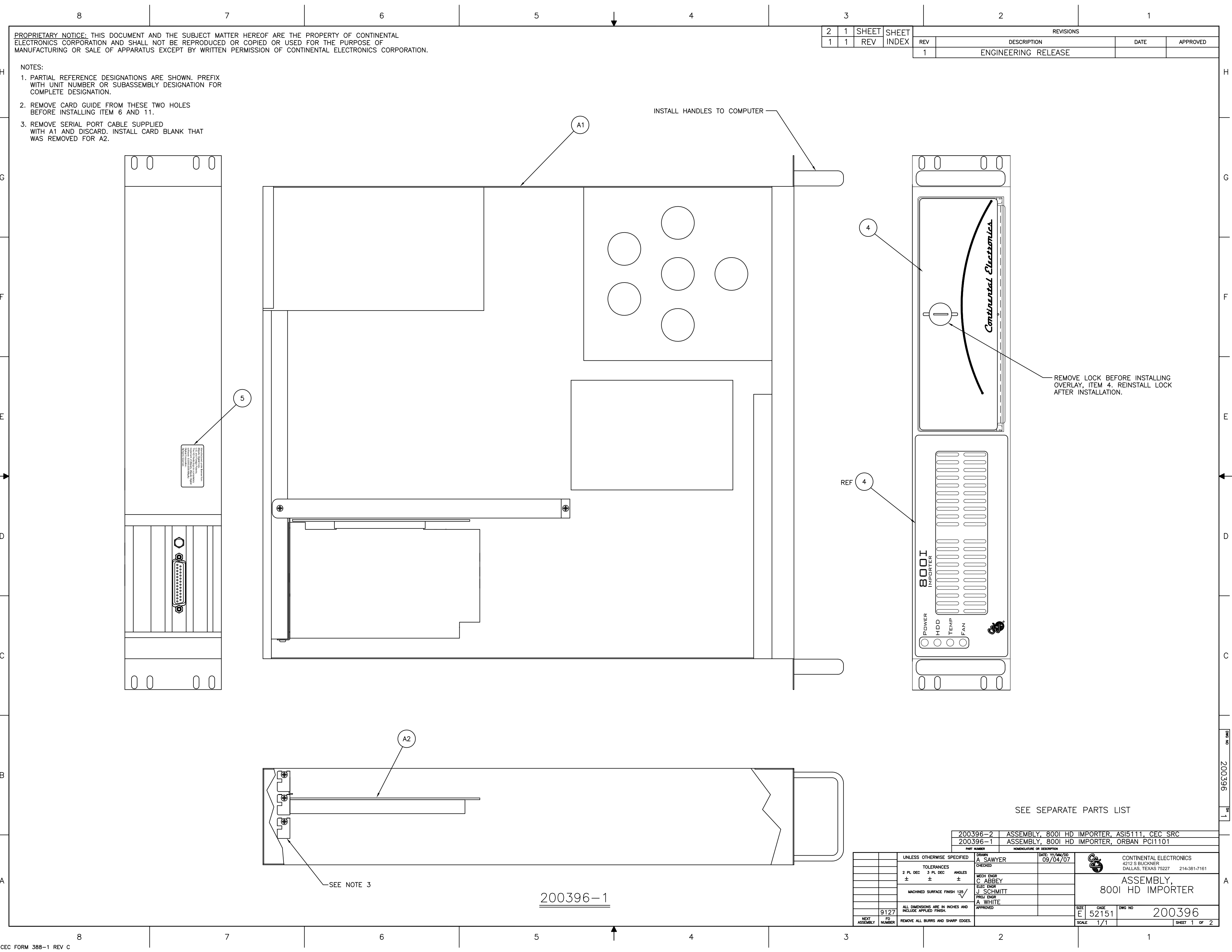
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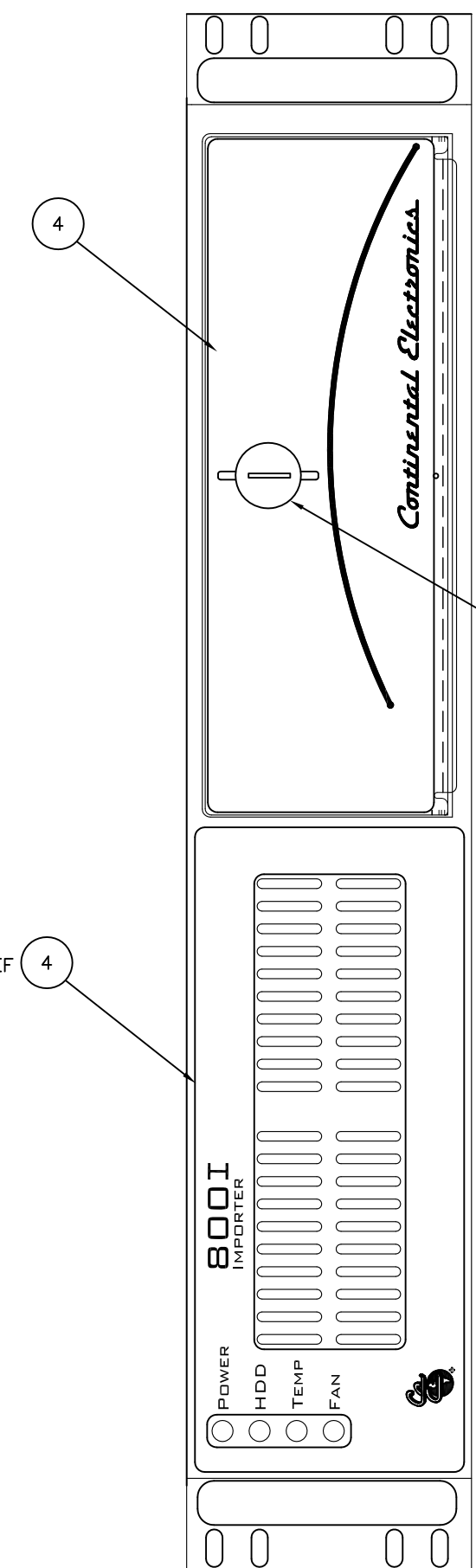
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1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NUMBER OR SUBASSEMBLY DESIGNATION FOR COMPLETE DESIGNATION.
 2. REMOVE CARD GUIDE FROM THESE TWO HOLES BEFORE INSTALLING ITEM 6 AND 11.
 3. REMOVE SERIAL PORT CABLE SUPPLIED WITH A1 AND DISCARD. INSTALL CARD BLANK THAT WAS REMOVED FOR A2.

INSTALL HANDLES TO COMPUTER

REMOVE LOCK BEFORE INSTALLING OVERLAY, ITEM 4. REINSTALL LOCK AFTER INSTALLATION.

SEE SEPARATE PARTS LIST

2		1	SHEET	SHEET	REVISIONS			
1	1	REV	INDEX	REV	DESCRIPTION	DATE	APPROVED	
				1	ENGINEERING RELEASE			



REF 4

200396-1

SEE NOTE 3

200396-2		ASSEMBLY, 800I HD IMPORTER, ASI5111, CEC SRC	
200396-1		ASSEMBLY, 800I HD IMPORTER, ORBAN PCI1101	
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REMOVE ALL BURRS AND SHARP EDGES.			
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		E	52151
		SCALE	1/1
		DWG NO	200396
		SHEET 1 OF 2	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

INSTALL HANDLES TO COMPUTER

REMOVE LOCK BEFORE INSTALLING
OVERLAY, ITEM 4. REINSTALL LOCK
AFTER INSTALLATION.

Continental Electronics

800i
IMPORTER

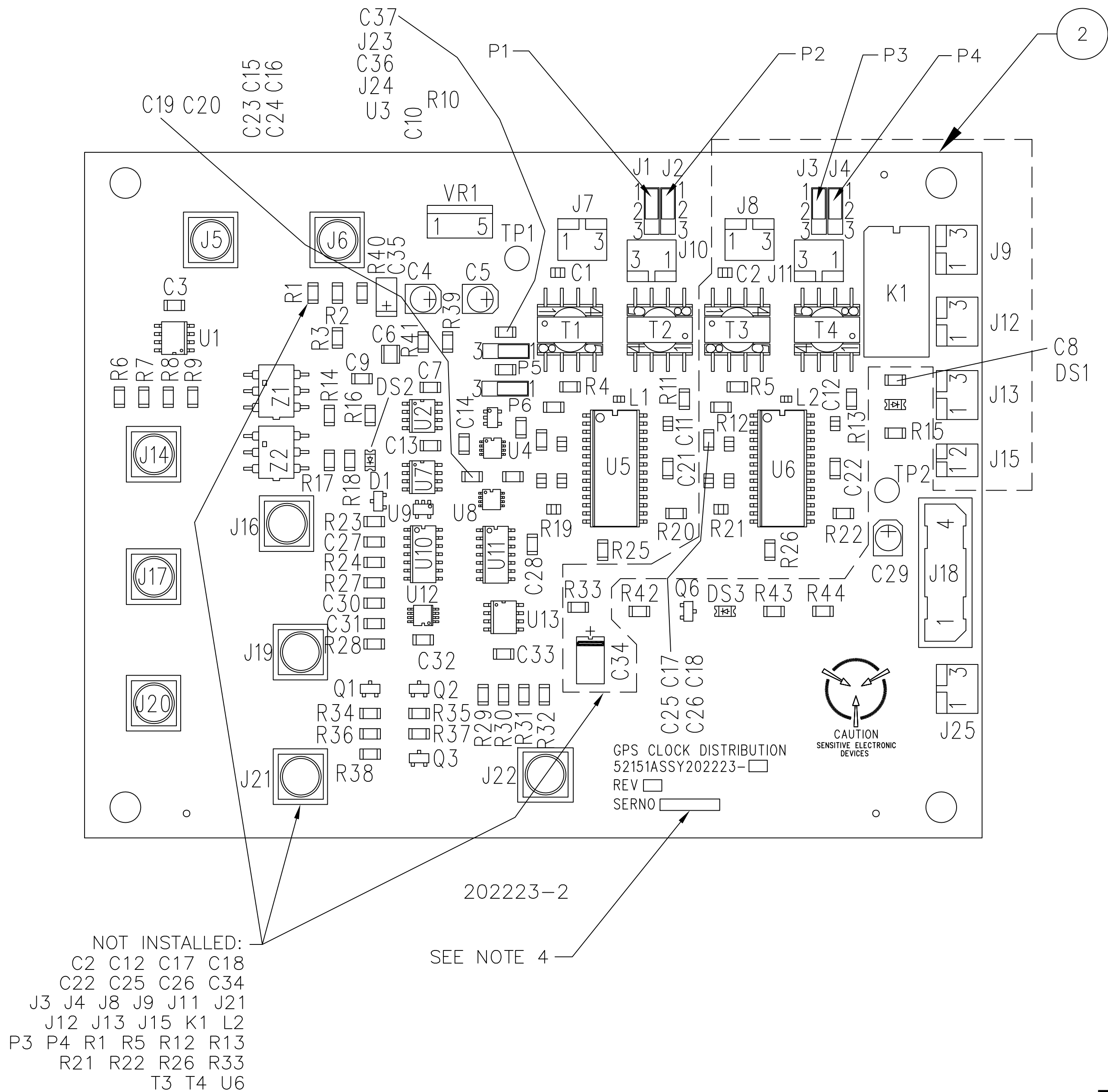
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200396-2

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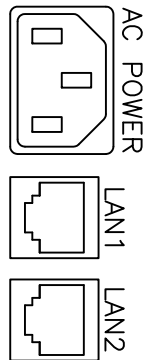
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A

IMPORTER REAR PANEL



10MHZ IN FROM EXPORTER/GPS

J3 CLOCK IN +

A2 ORBAN PC1101 AUDIO CARD

J1-1 AES1 OUT +
J1-14 AES1 OUT -
J1-2 AES1 OUT GND
J1-15 AES1 IN +
J1-3 AES1 IN -
J1-16 AES1 IN GND
J1-4 AES2 IN +
J1-17 AES2 IN -
J1-5 AES2 IN GND
J1-18 AES2 OUT +
J1-6 AES2 OUT -
J1-19 AES2 OUT GND
J1-7 ANALOG OUT RIGHT +
J1-20 ANALOG OUT RIGHT -
J1-8 ANALOG OUT RIGHT GND
J1-21 ANALOG IN RIGHT +
J1-9 ANALOG IN RIGHT -
J1-22 ANALOG IN RIGHT GND
J1-10 ANALOG OUT LEFT +
J1-23 ANALOG OUT LEFT -
J1-11 ANALOG OUT LEFT GND
J1-24 ANALOG IN LEFT +
J1-12 ANALOG IN LEFT -
J1-25 ANALOG IN LEFT GND
J1-13 CLOCK IN +

W7

CUSTOMER INTERFACE CABLE DB-25 TO XLR(AUDIO)/BNC(CLOCK)

PCI EXPRESS BUS

PCI EXPRESS BUS

PCI BUS

PCI BUS

PCI BUS

PCI BUS

A1 CPU BOARD

SCHEMATIC FOR ASSEMBLY 200396-1
ORBAN PC1101 AUDIO CARD
WITHOUT CEC SAMPLE RATE CONVERTER

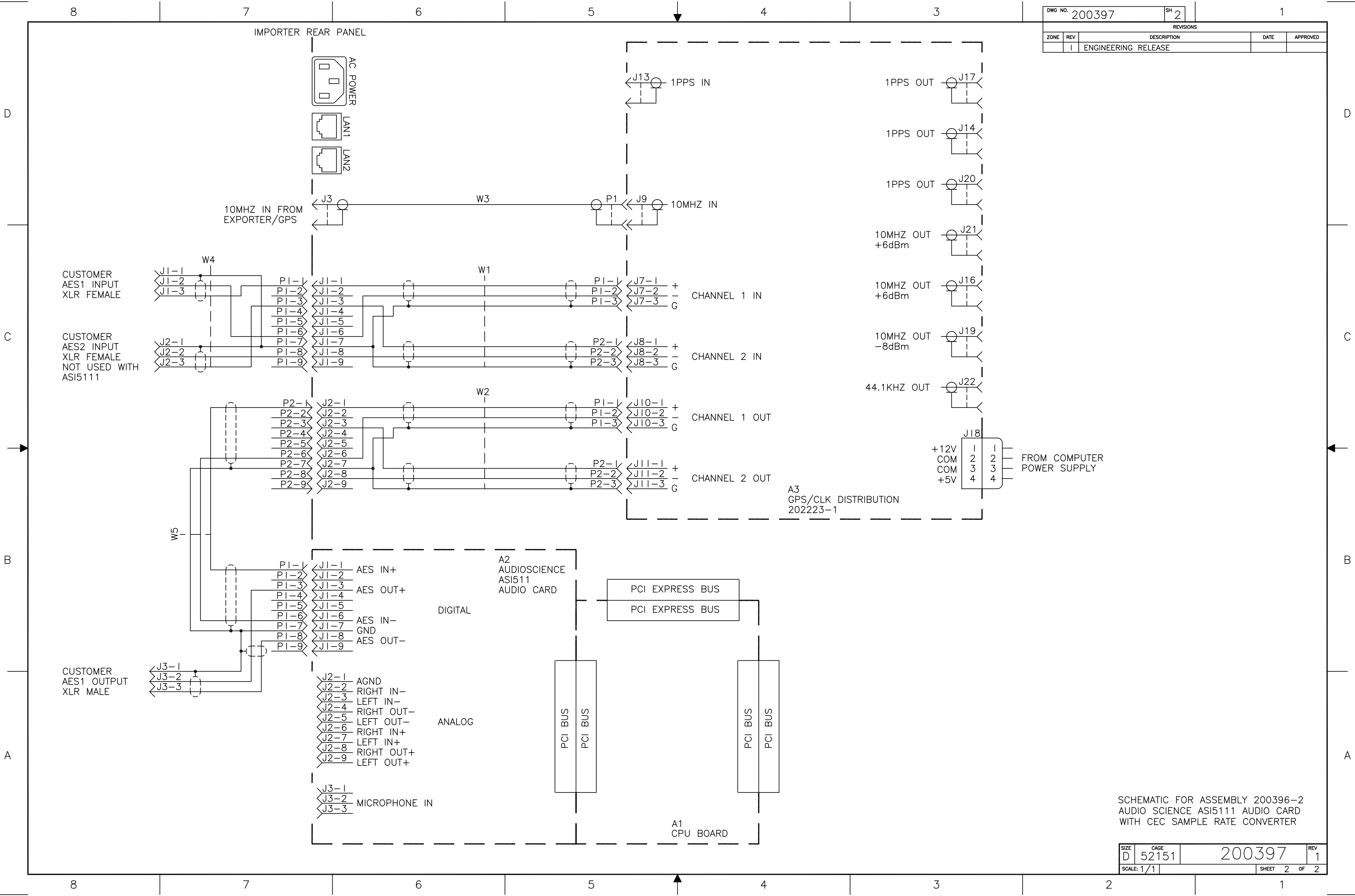
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TOLERANCES 2 PL DEC 3 PL DEC ANGLES ± .03 ± .015 ± 1°		CHECKED			
MACHINED SURFACE FINISH 125 ✓		MECH ENGR C ABBEY		SCHEMATIC DIAGRAM, 800I HD IMPORTER	
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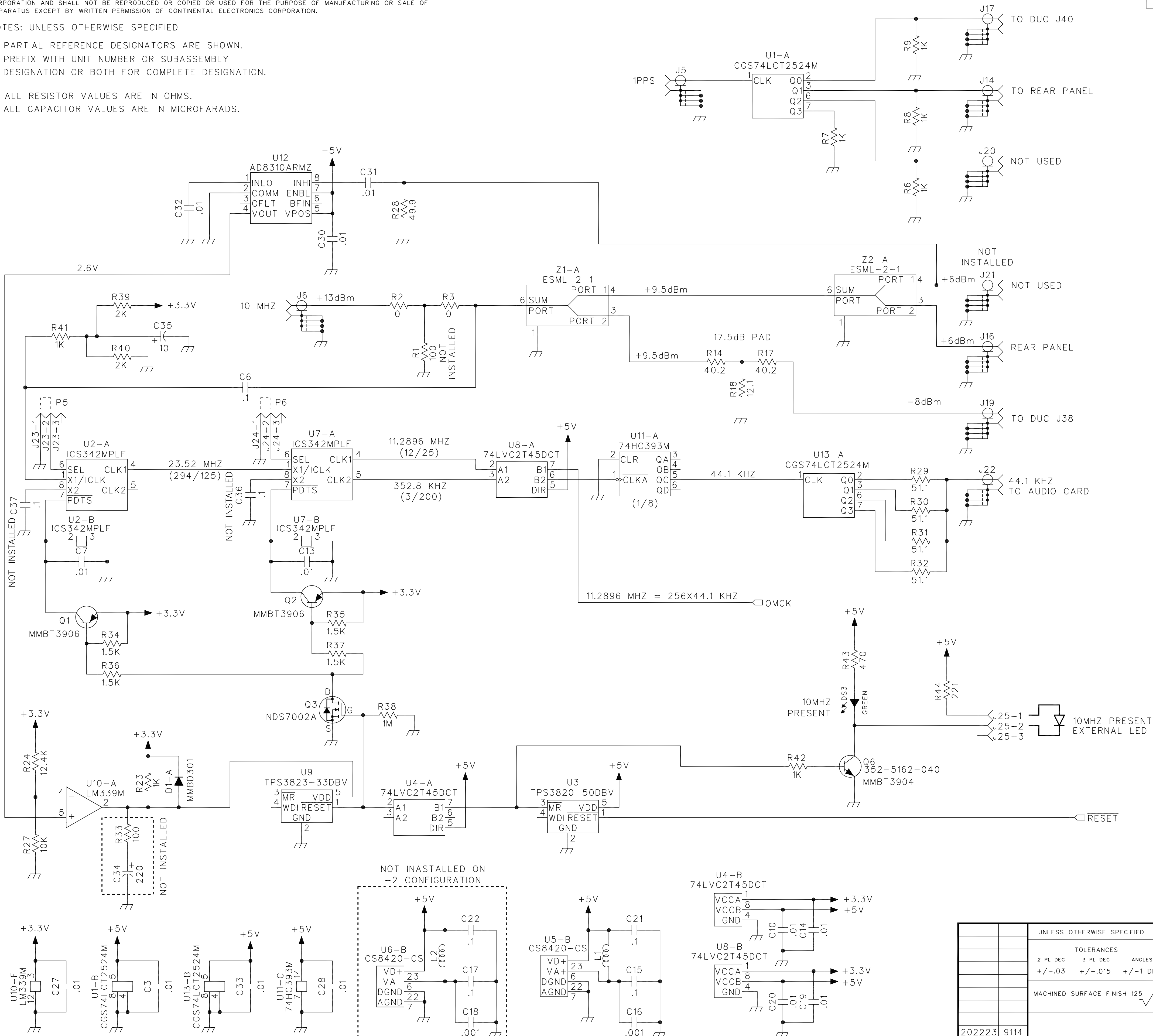
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SCHEMATIC FOR ASSEMBLY 200396-2
AUDIO SCIENCE ASI5111 AUDIO CARD
WITH CEC SAMPLE RATE CONVERTER

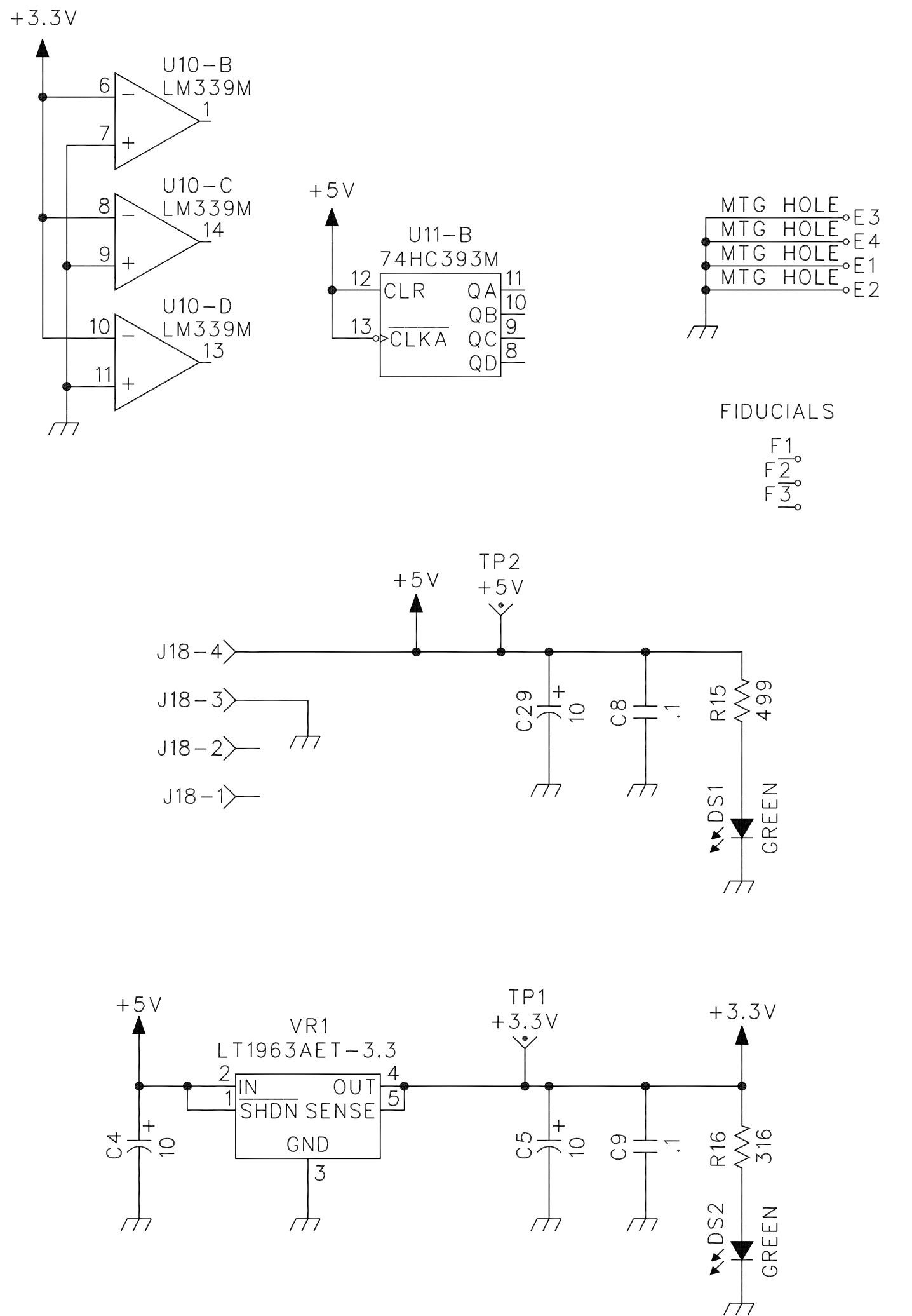
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ALL CAPACITOR VALUES ARE IN MICROFARADS.



DWG NO.		202224		SH 1				1	
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REV	DESCRIPTION					DATE		APPROVED	
1	ENGINEERING RELEASE								
2	RE ESIGNED					06-07-21		AS BW	
3	SH 1, ADDED D1 Q1-Q3 R33-R38 AND C34. U9 WAS TPS3820-33DBV					06-07-21		AS BW	
4	SH 1, VALUE OF R2&R3 WAS 12.1,R18 WAS 24.9,R14&R17 WAS 34, TEXT CHG'S					06-08-28		AS BW	
5	SH 1 & 2, ADDED BOXED AREAS FOR -2 CONFIGURATION					06-10-25		AS	
-	PRODUCTION RELEASE					06-11-24		CA	
A	REVISED PER ECN 06-0404N					06-12-19		AS JH	
B	REVISED PER ECN 08-0186N					08-09-17		JB JA	
C	REVISED PER ECN 09-0075N					09-02-28		AS AW	
D	REVISED PER ECN 09-0114N					09-09-28		AS	



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					PROJ ENGR D SPRAGG		06/06/07									
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NEXT ASSEMBLY	FO NUMBER	REMOVE ALL BURRS AND SHARP EDGES.								SCALE		N/A	SHEET	1	OF	2

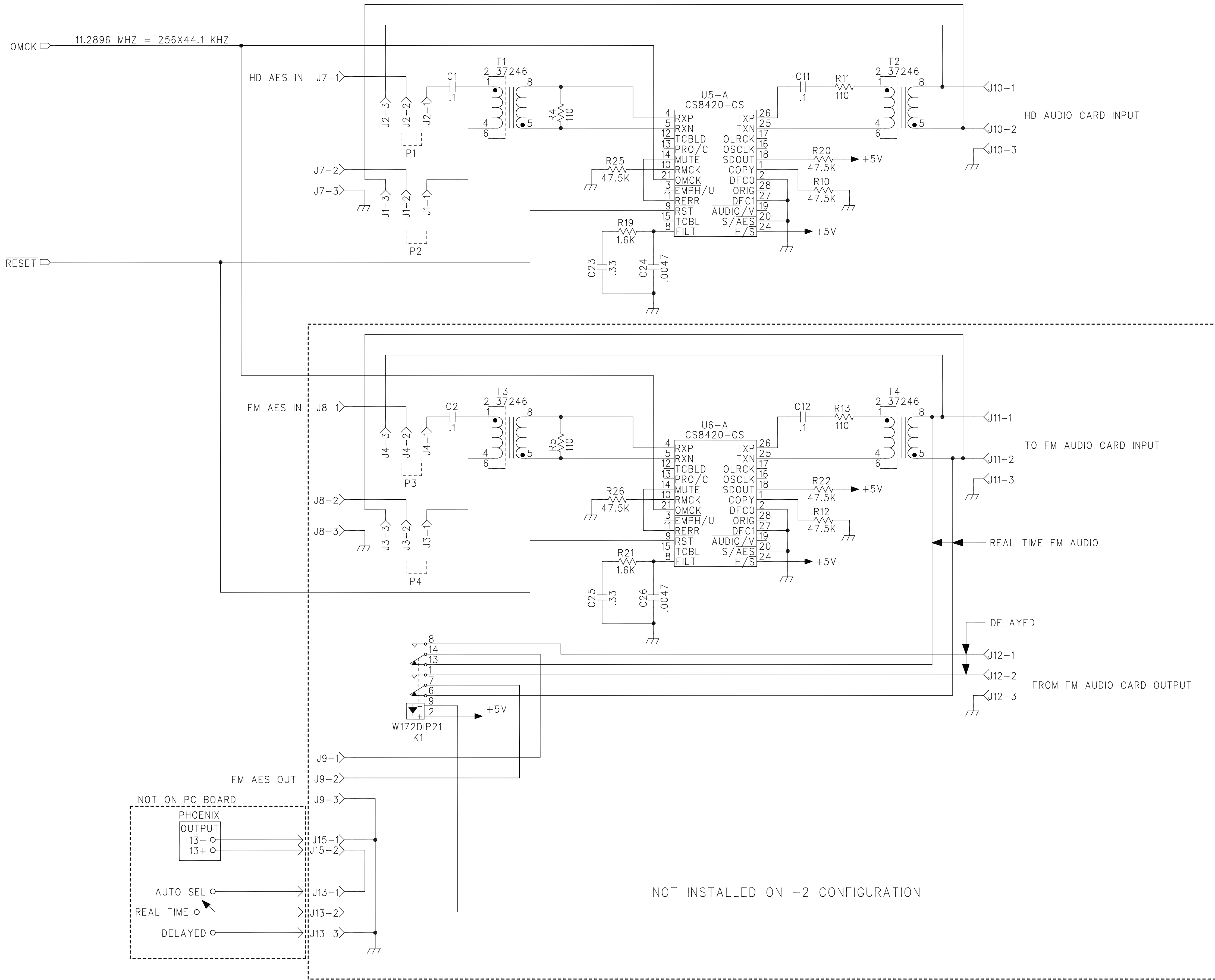
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